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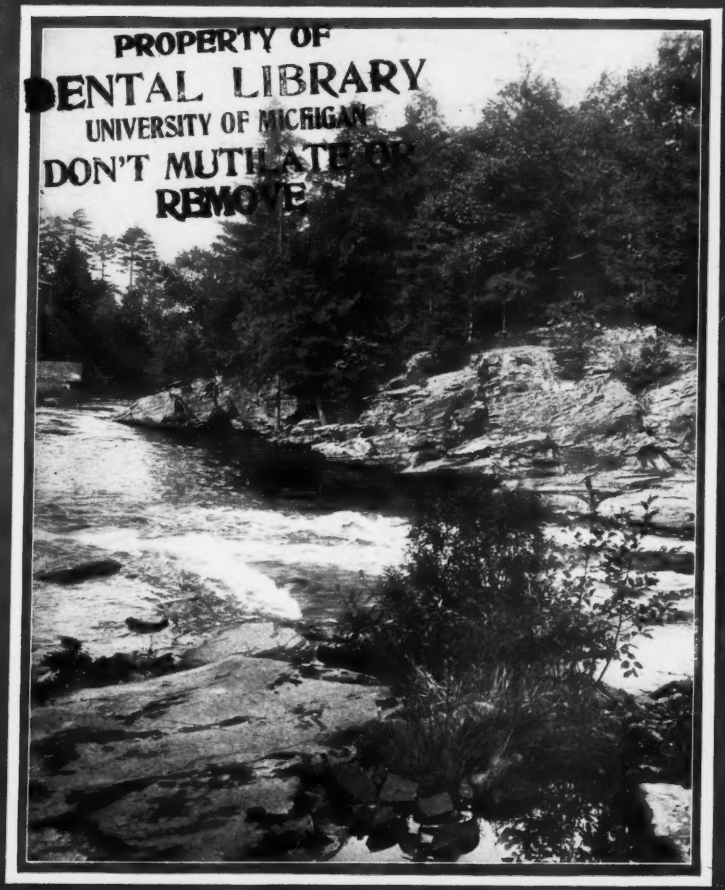
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THE
DENTAL DIGEST

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Influence of Pathological and Physiological States on Oral Conditions

By Waite A. Cotton, D.D.S., New York City

(Read before the Syracuse Dental Society at Syracuse, N. Y., March 1, 1921.)

"Why?" is the hinge to the door of reason, and it is because of so many "why's" that have been asked by patients during the past twenty years that I have attempted to open this door of reason for the oral conditions. The title of this paper was chosen because I wanted to call your attention to the distinction between the body being acted on by pathological and physiological conditions in the mouth, and the oral cavity being acted on by pathological and physiological conditions of the body.

Dental decay and pyorrhea do not occur in an individual when all the physiological functions are normal to that individual, but they may persist after the pathological conditions have been removed and the normal or functionally-balanced condition of that individual has been restored.

During the past few years we have had called to our attention the fact that we have been practising septic dentistry—septic because the roots of teeth that have died or been wantonly devitalized, not having been properly sterilized and filled, have permitted foci of infection to form. Missing teeth have been replaced, crowns have been put on and fillings put in without any regard to the cleanliness of the mouth.

Of persons from 25 to 30 years of age, receiving dental attention, at least 50 per cent have one or more infected teeth, and of persons over 50 years old, 90 per cent have infected teeth.

Both the medical profession and the public are looking to us for the elimination of these septic conditions in and around the teeth. What answer are we going to give them? Have we any answer except that implied in the methods we are now using—that is, the removal of all of the infected teeth we can find. Without question, this course is a sure one, but so is the cutting off of the head a sure cure for headache. We can hardly continue to satisfy the public with this answer.

When we were graduated from college we felt that we knew all that there was to know about dentistry, and all that we needed was to acquire

skill in the technique that had been taught us, to be masters of the profession.

It did not take long to find out that it was not all a matter of acquiring skill in technique, for some of the work that we did with the most painstaking care lasted only a short time, and other fillings, placed with no pretense to technique, lasted indefinitely. In pyorrhea the same thing was true; some cases responded to treatment very quickly while others did not.

The questions asked by patients were: "Why do the teeth decay around the fillings?" "Why do these other teeth decay?" "Why are my gums absorbing?" "Why do I have pyorrhea?" "When my dentist tells me that I am cured of pyorrhea, why should I return for periodic treatments?"

These and other questions we have answered, sometimes by passing the buck to our patients, by explaining to them that a clean tooth never decays, and that if they use the proper powder or dentifrice applied in the proper manner, all these conditions can be avoided.

In other words, we have been chasing ourselves around the stump with methods that have not been successful for the past 500 years, because we have clung to the idea that the oral cavity is not a part of the whole body and that its diseases and their cures are purely local. Perhaps a more potent reason for our lack of progress is that those who have been looking for systemic influence over oral conditions have attempted to find causes as definite as a pneumococcus germ that produces pneumonia.

I believe that a great deal of work along this line has shown but little result, because most of us expect to find the same reactions or conditions producing the same result in every patient, when as a matter of fact, each individual is a law unto himself and each individual changes from time to time. A physician once told me that most of his patients refused to get sick according to the books. Although this is true yet we can separate them into groups or classes in which the reactions seem about the same.

If systemic disorders have a marked effect upon oral conditions, as we believe they have, we can not be any more positive, off hand, in our diagnosis of the causes of decayed teeth, than the physician is when he wishes to account for a case of arthritis. It may be a dead tooth or it may be a half dozen other things; at present the tendency is to blame it on the tooth, because that happens to be the fad just now, and he can't find anything else.

In the endeavor to establish the influence of systemic states on oral conditions, it will be necessary to give my understanding of dental decay and pyorrhea, and I shall take these up in order.

By "systemic states," for the purposes of this paper, I shall mean

conditions of metabolism and function in their effect on the resistance of tissues. I realize that the origins of systemic states are often matters of difficult and obscure diagnosis in the detection and control of which, co-operation between dentist and physician is necessary.

Dr. Pickeral makes the statement in his book that the cavities of the body are protected to a large extent by the normal secretions that bathe them. This we believe to be true, and I have taken it as a basis on which to work.

To simplify our conceptions, we may compare the development of decay or caries to the growth of a grain of wheat. If we wish to produce more wheat, we must have three things: First, the grain of wheat, or seed; second, a fertile soil in which that seed can grow; and third, conditions that are favorable for the growth of the seed, that is, the proper environment.

In dental decay, the acid-forming micro-organism, decomposing food particles and a hyperacidity of the secretions entering the mouth, are the seeds of decay. The fluids and the temperature of the mouth are the environment; the tooth is the soil in and on which the seed grows.

The fact has been established by the researches of Miller and others, that an acid is necessary for dental decay, and the above mentioned "seeds" are the producers of this acid.

In experiments along this line I have used the following method: The regular gelatine medium was made as per the usual formula, except that I made one-half just slightly acid to phenolphthalin and the other half slightly alkaline to phenolphthalin. These were infected with matter from decayed teeth from different mouths; it did not make any difference which, as I merely wanted to get the micro-organisms that produce decay. These were allowed to grow until the growths on both alkaline and acid media could be seen. I found by litmus paper test, that the micro-organisms that would produce an acid would not grow in the acid medium, but would grow in the alkaline medium. There may be acid-forming micro-organisms that will grow in an acid medium, but I did not find them.

I then took cultures of the acid-producing micro-organisms and allowed them to grow until the whole medium was liquified. Broken pieces of tooth were placed in the dishes, and in a month, at room temperature, we had a very fine imitation of dental decay.

There can be only three ways in which these acid producers can be dealt with: First, by eliminating them entirely from the mouth; second, by destroying all that come into the mouth, and third, by maintaining the mouth and its secretions, which are the environment of the "seeds," in such condition that an acid cannot be produced.

It is manifestly impossible to exclude all micro-organisms and food from the mouth,

It is also impossible to destroy or eliminate all of these seeds of decay that are in the mouth. Many antiseptic mouth-washes, tooth powders, pastes and brushes have been given to the public as panaceas for dental decay, while dental decay is on the increase rather than decrease. Any germicide that is strong enough to kill the micro-organisms and prevent the particles of food that remain in the mouth from decomposing, will also be strong enough to destroy the tissues of the mouth.

I do not mean to assert that the cleaning of the teeth, by either the patient or the dentist, is a useless procedure, but I do say that it only helps to eliminate some of the causative factors. Prophylaxis bears the same relation to dental decay and pyorrhea that an antiseptic does to a wound. It helps to establish favorable conditions for the removal of local infective or decomposing material. It does not affect the systemic circumstances which exert an influence upon the oral secretions and the conditions in the mouth under which nature must work to produce immunity.

The hardness or softness of a tooth does not have any appreciable bearing upon dental decay, although it is quite possible that the individual resistance of a tooth is augmented to a large extent by Nasmyth's Membrane.

It is thus evident that sterilization and cleaning cannot of themselves stop the formation of acid in the mouth, although they are most helpful. We must then look to the condition of the secretions within the mouth, or the environment, in which "seeds" of decay can work.

Under certain physical conditions peculiar to the individual the fluid he secretes in his mouth is sufficiently acid to attack the teeth. This will be referred to later.

Nature must have provided a secretion in the mouth that will answer these requirements, for there are mouths that have never been artificially cleaned or sterilized in which decayed teeth do not exist. And as there are only two secretions in the mouth, one of them must fulfil these conditions.

Some writers designate all the secretions that are discharged into the mouth as saliva. I wish to make a distinction by calling saliva the secretion of the Parotid, Sub-maxillary, and Sub-lingual glands, and the mucous secretion a product of the mucous glands, for these two secretions are distinctly different both in composition and reaction.

As our knowledge of the saliva is far greater than that of the mucous secretion we will first examine the known qualities or characteristics of saliva to ascertain whether any of these can inhibit these "seeds" of decay.

First—The saliva is not a stable secretion, for we know that it varies to a considerable degree in its quantity and quality, depending on the kind of food stimulating its secretion.

Second—It is also not constant, as there is an increase in the secretion when food is taken into the mouth, which decreases to an actual suspension of secretion during sleep.

Third—It will not inhibit the growth of acid-producing micro-organisms, as slightly alkaline or neutral media are necessary for the growth of these organisms, and that is just what the saliva becomes when not being secreted for mastication; consequently they flourish in it.

Saliva does not readily combine with water, but does mix with most kinds of foods better than does water, making those foods alkaline.

Particles of food decomposing in an alkaline medium may form an acid, while food decomposing in an acid medium does not form *another acid* that can attack the teeth, for the reason that the decomposition is carried on by the micro-organisms previously mentioned.

The alkaline reaction of the saliva is increased by acid foods and diminished by alkaline foods, consequently most foods whether acid or alkaline that have been mixed with saliva and remain in contact with the teeth are alkaline, which creates favorable conditions for the growth of micro-organisms and decomposition, just what these "seeds" of decay need for the production of an acid. Stimulating the secretion and alkalinity of the saliva after eating, by acid mouth washes and powders merely helps to clear the mouth of the particles of food remaining in it, but does not change the conditions.

There has been considerable experimentation with saliva in the attempt to increase and maintain its alkalinity for the purpose of neutralizing the acid produced by the micro-organisms and the decomposing particles of food.

Is it not simpler that nature should provide some way for the inhibition of the production of these acids, rather than the neutralizing of them after they have been formed?

As I have written before saliva plays no part in the protection of the teeth except a mechanical one of mastication and deglutition and washing of food particles from the teeth. Its only other function is digestive.

The teeth are not evenly bathed with the saliva, for the teeth that are in close proximity to the openings of the salivary ducts are bathed in it almost continuously during our waking hours; and it is those teeth that are nearest the opening of the parotid gland which is the most aqueous and alkaline that we find the largest percentage of decay. Were the saliva a protective secretion, Nature would have more evenly distributed it over the teeth, and there would be less decay in the teeth that are most abundantly bathed, and more decay in the teeth that are less bathed, but the reverse is true.

The saliva is never acid except in some diseases, consequently there can be no acid from it that could attack the teeth directly.

From the foregoing it is evident that the saliva has no qualifications for the inhibition of these "seeds" of decay.

The mucous secretion is the only other secretion in the mouth besides the saliva. We will now examine its qualifications for the inhibition of these "seeds" of decay.

A secretion then that can prevent these "seeds" of decay from producing an acid must have certain characteristics, which are (1) stability, (2) constancy, and (3) capability of inhibiting the growth of acid-forming micro-organisms, and the decomposition of food particles left in the mouth. It must also be discharged into the mouth in such a manner that the major portion of it will be evenly distributed over that portion of the teeth and gums where these "seeds" of decay may collect and remain in contact with the teeth; it must also be of a consistency that it will not be easily dislodged, for if it does not remain in contact with the teeth it cannot perform its function.

1. Mucus is a stable secretion under normal conditions. It does not change as the saliva does, for it is not a secretion necessary for digestion and does not respond to food stimulus. It may vary under abnormal or pathological conditions, the same as any other secretion of the body.

2. It is constant in so far as we have been able to discover.

3. It will inhibit the growth of acid-forming micro-organisms, for it is acid in its reaction and acid-producing bacteria cannot grow in an acid medium.

It will inhibit the decomposition of food particles from forming acid on account of its acid reaction.

The distribution of mucus secretion is such that the major part of it is discharged on the teeth. Being a thick vacid secretion of high specific gravity, not mixing readily with either water or saliva, food particles will not easily stick to it or be imbedded in it.

It is evident from the above that the mucus secretion fulfils the requirements that are necessary for prohibiting the "seeds" of decay from acting, while saliva not only does not answer the requirements, but is actually an aid to the acid-producing seeds.

The reaction of this mucus secretion is given in *Kirk's Physiology*, page 229, as acid. I have found this to be true by testing this secretion in a good many mouths.

The easiest place to make the test is on that part of the upper lip that rubs against the teeth, and can be done with a good litmus paper in the following manner: Rinse the mouth with water to eliminate all the saliva possible from the part, and keep it away, for if the litmus paper becomes wet with saliva it will not take up enough of the mucus to test the reaction. The litmus must be kept in contact with the tissues

long enough to absorb sufficient of the thick vacid mucus to show its reaction, and this takes from three to fifteen minutes.

The glands of the cheek may be tested by holding a bell shaped glass tube over the opening of the parotid duct to carry away its secretion; always bear in mind that you cannot test the reaction of the mucus if your paper becomes wet with saliva. When it becomes less acid, as it does when the teeth are decaying, the reaction is very hard to get with litmus. Do not make the mistake of trying to obtain any reaction from the gums, for the mucous glands that protect the *teeth* are in the tissues that rub against the *teeth*. These are especially well marked on the lips and cheeks, on the sides and under surface of the tongue. On the gum and hard palate, these glands are absent.

The mucus secretion must contain a certain percentage of acidity for the inhibition of these "seeds" of decay if it becomes less acid, as it does when it reflects physiological and pathological disturbances along the *digestive* tract, then we begin to have the conditions or the environment in which these "seeds" can work in proportion as the mucus becomes less acid.

When the acidity of the mucus secretion becomes greater than is necessary for the inhibition of the "seeds" of decay, then the acidity of the mucus itself attacks the teeth, and this takes place or reflects a pathological or physiological condition in the eliminative tract.

We must remember that all dental decay is not due to lack of function of the mucous membrane. Traumatism, incomplete or imperfect calcification, and incorrect relations of the teeth also permit decay.

The nerves that supply the mucous glands are a part of the sympathetic nervous system. Persistent lack of function in any organ of the digestive and eliminative tracts, reflects back through the sympathetic nervous system to all the other organs, including the mucous membrane of the mouth.

There are two causes that explain the improper functioning of an organ of the digestive or eliminative tract.

Cause I—An inherent lack of proper functioning.

Cause II—Influences preventing or perverting its proper functioning.

In the past few years, I have been making clinical observations of the pathological and disturbed conditions of some of the organs of the digestive tract, in their influence on the secretions of the mucous glands of the mouth.

The secretions of some of the glands and membranes seem to bear a certain relation or antagonism to each other, by which increased activity of one is usually followed by diminished activity of one or more of the others; and a deranged condition of one is apt to entail a disordered state in the others. Such relations appear to exist between the

various secreting glands and membranes of the digestive and eliminative tracts and the mucous membrane of the oral cavity—as the close relation between the secretion of the kidney and that of the skin is a subject of constant observation.

I have found that lack of function in certain organs seems to have a marked effect upon certain areas of the mouth. Primary decay in the six upper anterior teeth I have invariably found directly traceable to lack of proper functioning in the stomach, under Cause I.

When the six lower anterior teeth are decaying, or have decayed, it is traceable to the lower small intestine, also Cause I.

When the upper bicuspids and molars are decaying, it is traceable to the stomach, as per Cause II.

When the lower bicuspids and molars are decaying, it is traceable to the intestines, as per Cause II. Usually we have a combination of both.

Because of the mobility of the cheek, these last two classifications do not always run true to form, but the major part of the decay will be as per classification.

When we have decay, not erosion, at the necks of the upper teeth, there will be a hyperacidity of the stomach; you will frequently find cracks in the upper lip produced from the same cause.

When the decay is at the necks of the lower teeth, you will find the cause in the lower small intestine.

Erosion is not really decay but is exactly what the word erosion indicates, and this does not come from any lack of function of the *digestive* tract, but does show a lack of function of the *eliminative* tract. The urea and uric acids are not being eliminated in sufficient quantities, and this, in people of fine texture, will produce a too-acid mucus.

One of the principal reasons, under Cause II, why the stomach and intestines do not perform their functions, is found in the toxic material that is discharged into them by infected sinuses, adenoids and hypertrophied and diseased tonsils. *Diet* is also a large factor in the lack of proper function of these organs.

I believe that 75 per cent of the dental decay in children and young people is due to adenoids, diseased tonsils, and improper diet.

Dr. Bogert, in his paper before the New York Medical Society, states that for many years he personally has felt that sugar plays a most important part in the development of adenoids and hypertrophied tonsils, and that he believes that recurrence after operation can be prevented, in almost every instance, by elimination or limitation of sweets in the diet.

Dr. William Osler said there is more mouth breathing in England than in any other country, this probably being due to adenoids. Dr. Harry Campbell in a paper read before the Royal Society of London, states that he believes the cause of adenoids to be a toxemia of intestinal

origin, and he suggests as a factor, the enormous increase in the consumption of sugar of late years.

These statements are of especial interest in view of the well known extent of decay of teeth in England. Moreover, I have been told by physicians who have returned from Egypt, Algiers and countries of like climate, where the air is dry, and the diet contains very little sugar, that the natives rarely have adenoids or diseased tonsils, and very few have decayed teeth.

Not every decaying tooth or infected root canal is causing rheumatism, or arthritis; nor is every diseased tonsil, infected sinus or poorly-functioning intestine causing decayed teeth.

Such individual factors as natural resistance and temperament enter into the problem. But we can be sure when we find decay in teeth, that we are dealing with a result—not a cause—that the oral secretions are not properly protecting the teeth, and that the secretions are abnormal because of some disturbance along the digestive tract.

To substantiate this theory of the influence of pathological and physiological states on dental decay through a disturbance of the protective mucous secretion, let me give you a few cases taken from my clinical records:

(1) Master Geo. S., age 13. This boy had been under my care for some years. Up to a year ago his teeth decayed rapidly in spite of constant care. Two years ago I examined his tonsils and found them diseased. I advised him to consult his physician. His tonsils were removed, and on his next visit to me I found less decay. During the past six months there has been no decay.

(2) Miss B. N. This case had been diagnosed as gastro-enteroptosis. In this condition the intestines do not assimilate or eliminate properly. Consequently the patient suffers from malnutrition, fermentation and gas formation. True to form, I found decay at the necks of the teeth, especially of the lowers, caused directly by the hyperacidity of the mucus secretion itself. Here is a case where the mucus shows a marked acid reaction around the lower teeth back of the cuspids, to a less extent around the uppers. There is practically no other decay in the mouth.

In some instances it is hard to get the facts, as the following case will show:

Miss V., aged 14. During the last year decay has commenced in the upper six front teeth. I suggested to her mother that she probably had indigestion, but was promptly informed that it could not be so, for she never complained of her stomach. A few minutes later I asked the mother if her daughter had a good appetite? She then told me that from the time the girl was four she had had a very peculiar appetite, for she would not eat cereals or drink milk, and would usually take only

a glass of water for breakfast, half a slice of bread and butter for lunch, with a few vegetables and a little piece of meat for dinner. She never played or ran around like other children but preferred to sit still. She had been taken to the doctor a number of times to see why she did not eat enough to keep a bird alive. I then asked the mother if she thought her daughter had a normally-functioning stomach with such a history?

Be sure you get your facts correct before you put the case in the exception class, for patients do not always know or remember the facts.

In the first part of this paper we considered the influence of Pathological and Physiological States on Dental Decay; in the second part we shall consider the influence of Physiological and Pathological States on Pyorrhea.

You will note that in dental decay we have dealt entirely with the secretions of the *digestive* and *assimilative* organs. In pyorrhea we will consider the *excretions* of the *eliminative* tract.

I am assuming that you will agree with me, that pyorrhea is of systemic origin. Undoubtedly there will be some who still adhere to the idea of local causation.

Dr. Howe, of Boston, gave the best answer to that question when he cited the results of his hundreds of experiments on both humans and animals. Not one case of pyorrhea, he declared, had ever, to the best of his knowledge, been produced artificially, by infection from pyorrhea pockets. It is quite evident that the tissues were too resistent to allow the infection to act.

The illustration used in the case of decay—the seed, soil and environment—will also apply for pyorrhea. The "seeds of pyorrhea," as given and accepted by the profession, are calcareous deposits, micro-organisms, faulty dentistry, and traumatism.

The environment is the moisture, warmth, and general uncleanliness of the mouth. The soil in which these seeds grow is the tissue surrounding the teeth.

Of the seeds of pyorrhea the micro-organisms are always present in every mouth, just waiting for a chance to infect the tissues surrounding the teeth when a calcareous deposit, faulty dentistry, or traumatism has caused sufficient irritation to a tissue of lowered resistance allowing their entrance.

In my paper on "Observations of Calcareous Deposits from the Oral Secretions," I have described why they form.

For that reason I will take up the practical side of the formation of deposits on the teeth, which if they can be eliminated would be one of the greatest helps in the prevention of pyorrhea.

In the examination of hundreds of samples of urine I have found a *reverse* relationship between the amount of chlorides and phosphates eliminated, and the calcareous deposits on the teeth.

In comparing this relationship there are certain individual condi-

tions to be considered such as age, weight, occupation, type, perspiration, quantity and kind of food eaten, and texture.

Age: A man at 50 years of age naturally retains more of these substances in his body than a man of 30, for the eliminative organs at 50 usually do not function as well as at 30.

Weight: A man weighing 200 pounds should certainly eliminate more than a man weighing 100 pounds.

Occupation: A man working in a ditch with a pick and shovel will have more chlorides to be eliminated than a man performing less muscular work.

Perspiration: This must be estimated to find how much salts have been eliminated by this method.

Quantity and kind of food: If a man is taking into his body quantities of material that he does not use or eliminate it must remain in his body.

I will illustrate this by giving a few of my records showing the relationship between the elimination through the urine and the deposits on the teeth.

Mr. L., age 43, height 5 ft. 9 in., weight 165 pounds. Perspires easily, appetite good, meat is principal food. Drinks three cups of coffee and two of water per day. Texture, fine. 30 oz. of urine eliminated per day; color reddish yellow. Sp. gravity, 1026. Urea .032. Uric acid .36. Chlorides .03, Phosphates 2.3, Indican, increased.

From the above none of the salts is being eliminated in sufficient quantities; the chlorides and the uric acid are retained the most; we find in the mouth a large deposit on the lower front teeth, and one-half as much, in proportion, of the hard deposit on the other teeth. A good deal of absorption of the gums.

Mr. W., age 40, height 5 ft. 8 in., weight 170 pounds, occupation, mechanic. Perspiration, easy. Appetite good. Meat is one-half of diet. Texture, medium. Urinary analysis five years ago—quantity 40 oz. Sp. gravity 1022. Urea .002. Uric acid 1.557. Chlorides 1.5, Phosphates .8. Some constipation.

The deposits collected rapidly on the teeth and were removed every month. The discharge persisted around the lower front teeth.

This man was told to drink from eight to twelve glasses of water per day and keep his intestinal elimination free.

Urinary analysis of one year ago—quantity 75 oz. Sp. Gravity 1017. Urea .017. Uric acid 1.5. Chlorides 1.1. Phosphates .7.

The deposits have decreased 75 per cent. The discharge has stopped and the teeth have tightened up. No other treatment has been given outside of keeping the deposits from the teeth and eating less meat.

There is another deposit that we find on the lingual side of the upper centrals and laterals which does not seem to have any relationship with the other deposits of the mouth, but I have observed that it

does have a relationship with the functioning of the liver, for whenever I find deposits and pyorrhea in this area I always find that there is a lack of function of the liver. This applies particularly to the centrals.

In every mouth we have always present two factors for the production of pyorrhea; namely, the seeds and the environment. And yet we do not always have pyorrhea. Obviously, the condition or nature of the soil—that is, of the tissues surrounding the teeth, must be the determining factor. Histologically and anatomically, we can see no difference between gum tissue that is susceptible and gum tissue that is not susceptible to the seeds of pyorrhea. But neither are we able to observe a difference between two men infected with the typhoid germ. We only see that one dies and the other does not even become ill. We explain the difference here as a matter of individual resistance to the typhoid germ at that particular time. In like manner, the tissues of the mouth in one individual are susceptible and in another they are not.

This brings us to the consideration of why these tissues differ in their susceptibility.

The two things that take place in the digestive tract of the most interest to us are its secretions and its absorption of toxic material.

In my paper on "Observations of Toxic Substances in their Relation to Oral Conditions," I have discussed at some length how toxic material accumulates in the body through the lack of adequate functioning of the eliminative tract.

We have noted the effect of the inadequate functioning of the urinary tract upon calcareous deposits; we have also observed the effect of the perverted secretions of the digestive organs upon the secretions of the mucous membrane of the mouth, allowing decay to take place.

I would define assimilation and absorption from the digestive tract as two distinct things: assimilation is the act or process of taking from this tract foreign material capable of becoming living substance; absorption is the act of taking from this tract waste and toxic material that cannot become living substance.

If the secretions and elimination of the digestive tract were functioning properly we would not have the absorption of toxic and waste material, for the toxic material would not be produced and the waste material would be eliminated before it could be re-absorbed.

The same two reasons for the lack of function of an organ hold good here, which are the inherent lack of proper functioning, and influences preventing or perverting its proper functioning.

It does not make any difference in this case which reason it is so long as the material that we do not want is absorbed.

I will give a few of the reasons that may cause these conditions: Lack of tone of the muscle fibers; pressure by a growth or the enlargement of another organ; adhesions; pockets along the tract where material may collect.

We have observed how the lack of proper secretions in any particular area will have its effect upon the secretions of a particular area of the mouth; the same rule holds good as the absorption in a certain area will have the effect of lowering the tone of the tissues in that same area in proportion to the absorption. Here also comes in again the factor of individual tissue resistance.

In every mouth we have the seeds for pyorrhea just waiting for a chance to commence operations, when the soil or the tissues surrounding the teeth have had their resistance lowered below the virility of the seeds.

The following are taken from my records:

Mrs. F., age 60, height 5 ft. 4 in., weight 160 pounds. Vital type. Perspiration, medium. Appetite, good plus. During the last few years has not eaten much meat. Texture, medium. Drinks only one cup of coffee and three glasses of water. Eliminates only 36 oz. of urine per day. Sp. gravity 1026. Urea .033. Uric acid, .62. Phosphates 1.5. Chlorides 2.4. Constipation, always some.

I have treated this patient for some years. She has had comparatively little deposit on the lower front teeth—more of the hard black deposit, and twice as much of gum absorption. About a year ago the few remaining teeth she had were removed.

Mrs. H., only 29 years old, height 5 ft. 6 in., weight 140 pounds. Occupation, cashier. Perspiration, easily produced. Appetite, good, meat composes one-half diet. Drinks three cups of coffee and three glasses of water per day. Medium fine texture. Urine, 36 oz. in 24 hours. Sp. gravity 1018, which is low for the amount eliminated. Urea .016. Uric acid .29. Phosphates .1. Chlorides .1. The deposits on the teeth are about equally divided and must be removed frequently. The colon has never functioned properly. She has lost the second and third lower molars from pyorrhea, and the first molars are in none too good condition. What else could be expected from the above history?

To-day no one doubts the bad effects of foci infection at the apex of the tooth, or of pyorrhea upon a person's health. The facts are too well established to need discussion here. If dental decay and pyorrhea are the results of local conditions in the mouth, then it is our problem, as dentists, to find some way to control the conditions. If they are of systemic origin, as I believe they are, then the only solution lies in the co-operation of the dentist and the physician.

Very few patients ever consult a physician, unless they are actually ill. Yet few of us ever enjoy perfect health. The number of people apparently in good health, who consult the dentist, is increasing yearly. The fact that the teeth of the average person need attention tempts us to the conclusion that the organic system is not functioning

properly. It is the dentist's duty to note the oral conditions and call the patient's attention to the probable internal disorders that cause them. Both as an ethical and as a practical proposition, patients should be instructed to visit their physicians. It is essentially the doctor's business to establish precisely the seat of the disturbance and to prescribe the necessary treatment for the elimination of the primary causes of dental decay and pyorrhea.

I hear some one ask, What are we going to do for a profession if the medical profession eliminates by systemic treatment all the oral conditions that we are treating?

There will not be any more eradicating of dental conditions by medical treatment than there is of general diseases by medical treatment. By the better understanding of the Influence of Pathological and Physiological states on the oral conditions, we as dentists can exercise better judgment in the technical work performed for each patient as an individual, and take our places as dental specialists in the general science of Medicine.

Controlling the Shrinkage of Rubber During Vulcanization

By Alfred Gysi, D.D.S., Zurich, Switzerland

Doctor G. B. Snow published in the Dental Cosmos, September, 1918, a remarkable article on this subject. His experiments have demonstrated that during the process of vulcanization the rubber suffers two kinds of loss of volume:

First. Loss through contraction by cooling.

Second. Molecular shrinkage during the change from the semi-fluid state before vulcanization into the hardened state after vulcanization.

Let me explain this by Figure 1.

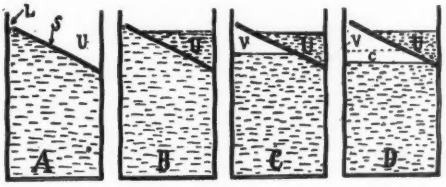

Fig. 1

(A) is a vessel having in its upper portion an oblique separation plane (S), dividing the vessel into an upper (U) and a lower part (A). At the highest portion of the separating plane is a small opening (L). The lower portion is filled with a saturated solution of table salt.

We have now the following correlations with our vulcanization flasks. The vessel is the flask. The salt solution in part (A) represents the rubber. The opening (L) represents the escape grooves for the rubber. The upper part (U) represents the groove for the surplus. Everything in (A) is at ordinary room temperature. We now heat this salt solution to about 190° Fahrenheit (Illustration B). The solution will then expand as every material does, and the increased volume will flow over into the escape space (U). This temperature of 190° Fahrenheit is kept up for about half an hour (Illustration C), which produces a loss by evaporation (V). For the rubber this represents the molecular shrinkage by which the density and specific gravity of the rubber is increased. Illustration (D) shows the results after the flask and its contents have cooled to room temperature. The cooling produced (1) a contraction (C), just as every material decreases in volume at lower temperature. This loss of volume is due to the fact that the overflow portion (U) is caught in its receptacle and can not reunite with the main portion (D). (U) represents, therefore, the loss by contraction from

cooling. This happens also during the vulcanization of rubber, because the hardened rubber in the escape grooves can not flow back during the cooling down after vulcanization. (2) After the cooling to room temperature, the salt solution crystallizes on account of the loss of water during the prolonged heating. Similar processes take place during the heating of the rubber, during which it loses a certain amount of hydrogen which is replaced by sulphur, and so the rubber becomes hard.

In Illustration (D) the empty spaces (V) and (C) represent the entire loss caused by the heating. (V) is the loss by molecular shrinkage and (C) the loss from contraction during the cooling process.

In the above-named article, Doctor Snow gives the percentages of these two sources of loss of volume. But in my opinion Doctor Snow has started his experiments at the temperature of boiling water and compared the volume of the vulcanized rubber with its volume at boiling heat. The expansion of the rubber from room temperature up to the boiling point was, therefore, neglected. The time for this lecture is too short to permit me to show this.

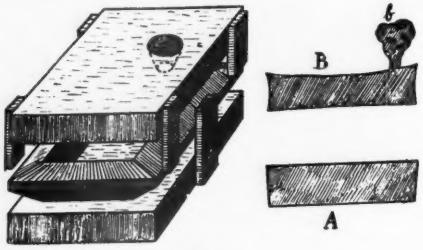

Fig. 2

I have repeated Doctor Snow's experiments with a flask like that used by Doctor Snow. My flask, however, differs in so far that it can be filled with rubber at room temperature.

The illustration (Figure 2) shows the general arrangement of the flask. It consists of two heavy brass plates which serve as bottom and cover for a frame. The cover can be removed and the flask filled with a thick piece of rubber at room temperature. In the upper brass plate is a hole for the escape of the surplus rubber. After the flask is filled with rubber, the surplus of rubber which comes out of the hole, when the cover is screwed down, must be cut off. In (A) Fig. 2, is shown the form of the rubber volume contained in the flask at room temperature, and at (B) is shown the result after vulcanization. Notice the concave surfaces of the vulcanized plate. At (b) is shown the overflow rubber caused by the expansion during the heating. This overflow could not flow back after vulcanization, because it had hardened meanwhile. On

account of this loss by expansion and contraction and by the molecular shrinkage, the surfaces of plate (B) are no longer straight, but are concave, so that this plate (B) is considerably thinner than plate (A).

In order to determine the percentage of these two losses, the following procedure was followed: The capacity of the flask was first determined by filling it with a kind of moldine, then immersing it in water and measuring the volume of the water displaced.

The results of this experiment can now be shown by simple numbers. Let the capacity of the flask be 100 cubic centimeters. We now fill the flask at ordinary room temperature with black rubber, take off the excess in the escape hole, screw the flask tightly together and vulcanize the rubber in the ordinary way, and remove it from the flask.

The volume of the rubber plate with the attached overflow is measured, and then the overflow alone is measured, also, in the manner illustrated and described in Fig. 2b. In order to make this as plain as possible to you, Fig. 2b gives not the real figures up to the third deci-

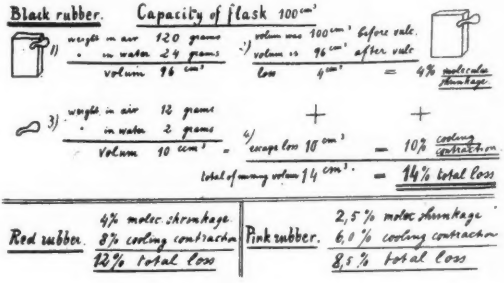
Black rubber.
Capacity of flask 100 cm³
1) weight in air 120 grams
in water 24 grams
volume 96 cm³
2) volume was 100 cm³ before vulc.
volume is 96 cm³ after vulc.
loss 4 cm³ = 4% molecular shrinkage
3) weight in air 12 grams
in water 2 grams
Volum 10 cm³
4) escape loss 10 cm³ = 10% cooling contraction
total of missing volum 14 cm³. = 14% total loss
Red rubber.
4% molec shrinkage
8% cooling contraction
12% total loss
Pink rubber.
2,5 % molec shrinkage
6,0 % cooling contraction
8,5 % total loss

Fig. 2b

mal, but only average figures, starting with a flask capacity of exactly 100 cubic centimeters, which enables you to see the percentages without calculation.

A comparison between the results thus obtained for black, red and pink rubbers shows clearly that the more foreign coloring matter a rubber contains, the less is the loss of volume during the vulcanization process.

The practical experience of dentists has proven that the more coloring matter a rubber contains, the more brittle the rubber is, and that a minimum of coloring matter gives the best physical properties to the vulcanized rubber.

So, the rubber has two opposing qualities. If great elasticity is desired, black rubber should be used. This, however, shows the greatest loss of volume and change of form and therefrom loss of suction, as the result of vulcanization. Pink rubber exhibits a minimum of elas-

ticity and a maximum of brittleness, but shows the least change in volume and form, as the result of vulcanization.

The object of my investigations was to learn a procedure by which to overcome the undesirable qualities of both kinds of rubber and to utilize the desirable qualities of both, that is, to obtain a minimum of shrinkage and a maximum of elasticity. Before describing these investigations, we will study the physical phenomena during the process of vulcanization, in order to see how and when the expansion from heating takes place, when and how the molecular shrinkage takes place, and how the cooling contraction takes place.

For this purpose I constructed a vulcanizer which is open at the top, so that the whole process can be observed with the eyes.

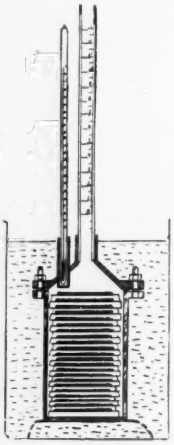

Fig. 3

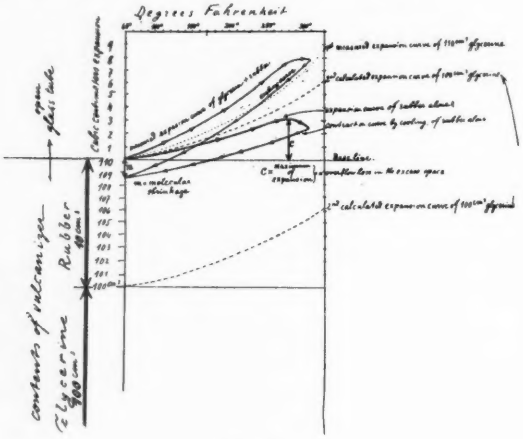

Fig. 3b

How is this possible?

It has long been known that it is not the steam pressure that is essential for vulcanization, but the heat of about 320° Fahrenheit. By vulcanization in water, this heat is reached only by applying steam pressure in a closed vessel. But, if vulcanization takes place in glycerine, the necessary heat for vulcanization is reached without pressure, because the boiling point of glycerine is far above the temperature required to vulcanize rubber.

I inserted into the top of a small vulcanizer (Fig. 3) a glass tube with cubic centimeter scale, and a thermometer with a long scale, permitting me to read very exactly centigrade degrees. In the vulcanizer were twenty-two small aluminum tables, on each of which could be laid a piece of unvulcanized rubber. The cover of the vulcanizer is conic, so that all air or gas bubbles can freely escape and not interfere with the volumetric measurements.

The interior of the vulcanizer was filled up to zero point with glycerine, which was previously dehydrated by boiling, and the vulcanizer was placed in a larger vessel, filled with glycerine, so that during the vulcanizing process the temperature is evenly distributed throughout the vulcanizer.

Now it can be easily understood that any change of volume of the rubber during the vulcanizing process can be controlled on the scale of the open glass tube. Of course, the glycerine in the vulcanizer expands, also, during the heating up to the vulcanizing temperature. So, it is necessary first to establish the volume of the glycerine in the vulcanizer without any rubber being present. Then, it is necessary to establish the curve of expansion of this volume of glycerine at intervals of thirty degrees, up to 320° Fahrenheit. This enables us to determine the expansion and the molecular shrinkage of the rubber, by watching the heights of the column of glycerine in the open tube and comparing these heights with the normal glycerine curve.

As a result of this glycerine vulcanization experiment, it was possible to determine: (1) That the rubber reaches its maximum of expansion at about 280° Fahrenheit, and then the molecular shrinkage begins and continues until the end of vulcanization. (2) If the vulcanization temperature was not raised above 300° Fahrenheit, no bubbles of hydrogen sulphide escaped through the open glass tube, but if the temperature was raised above this point, then much hydrogen sulphide was produced.

That the gas bubbles which rose in the glass tube were hydrogen sulphide and not glycerine or water vapor was proved by passing them through a solution of copper sulphate, whereby a black precipitate of copper sulphide was formed. In this way, it was possible to prove that the chemical process of rubber vulcanization is a purely additive process when the temperature does not rise above 300° Fahrenheit. That is, the rubber molecule $C_{10}H_{16}$ took up two atoms of sulphur, so that its formula changed into $C_{10}H_{16}S_2$.

But, at a temperature above 300° Fahrenheit, a so-called substitution process took place, so that the rubber molecule first expelled four atoms of hydrogen, $C_{10}H_{12}$, and then their place was taken up by two atoms of sulphur, $C_{10}H_{12}S_2$, and the expelled hydrogen united with the sulphur, $4H + 2S$, to form two molecules of H_2S, hydrogen sulphide.

For this reason, we get by the vulcanization below 300° Fahrenheit a more homogeneous vulcanized rubber, free from microscopic bubbles, and at a temperature above 300° Fahrenheit, the rubber is filled with microscopic bubbles of hydrogen sulphide, by which a bad odor is generated. The microscopic bubbles should not be confused with the microscopic porosity which is produced by heating the rubber too rapidly during vulcanization.

Is it possible to avoid the loss of rubber by shrinkage? Is the loss by shrinkage large enough to justify taking the pains to avoid it?

Figure 4 represents a plate of vulcanized rubber of 5 mm. in thickness and with a surface of 20 square centimeters. The shaded area represents the loss of volume such a plate would exhibit after vulcanization, if this loss were drawn together in one corner instead of being distributed evenly throughout the whole plate.

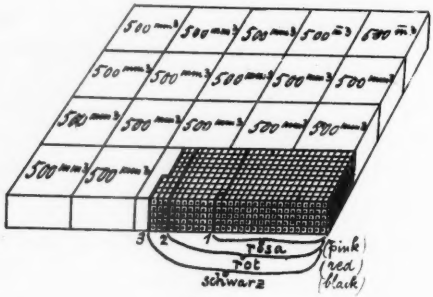

Fig. 4

This figure shows the loss of a black rubber plate, a red rubber plate, and a pink rubber plate. The loss of black rubber would reach from the corner to the thick line 3, equal to 13.7 per cent. The loss of red rubber would reach from the corner to the thick line 2, equal to 12.3 per cent. The loss of pink rubber would reach from the corner to the thick line 1, equal to 8.5 per cent. From this figure one can see that whether or not a vulcanized rubber plate loses from 8 to 13 per cent. of its volume is very important.

Doctor Snow tries to overcome this loss by overfilling the flask by an amount related to the thickness of the rubber plate to be made and by placing between the two halves of the flask pieces of sheet metal from 0.25 mm. to 0.4 mm. in thickness. This prevents the complete closing of the flask during the rubber-pressing and leaves the rubber space overfilled from about 8 to 13 per cent. Of course, before putting the flask in the vulcanizer, these metal pieces between its halves must be taken out and the flask should be placed in the vulcanizer under slight spring pressure or under the screw which goes through the cover of the vulcanizer. During the end of the vulcanization and during the cooling down, the spring or the screws should be tightened in order to close the flask during the shrinkage of the rubber.

(*To be continued*)

Geometry of Mandibular Movements

By J. Leon Williams, D.D.S., L.D.S., New York City

(Read before the National Society of Denture Prosthetists, Boston, Mass., August 20, 1920.)

THE present paper is a continuation and completion of the paper which I presented at New Orleans, last October, on the same subject. The significance of what I have to offer today, will be clearer if I briefly recapitulate the former report.

It will be remembered that this work was undertaken as the result of an experiment which I made in my own mouth. I found that a bit of pencil point fastened between the lower central incisors could, by movements of the mandible, be made to inscribe on a card fastened to the upper teeth.

These diagrams revealed some very important facts. They show that when the jaw movements are freed from the controlling action of the cusps, the mandible has, within a gauge of nearly a centimeter, universal movement with a constantly changing rotation point. This suggested quite a number of points in the intricate problem of mandibular movements that were open to further investigation.

Perhaps the two most important questions suggested were these: Do the cusps of the teeth guide the movements of the mandible during mastication in a perfectly determined and fixed path, as the interlocking cogs of wheels guide movement, or is there considerable freedom of movement subject to the will or nervous reaction from stimulus? Was the record in my own mouth an exceptional one and do mouths vary greatly in this capacity for freedom of movement? The bearing of these questions, you see, is intensely practical in their application to dental prosthesis.

Just to the extent that there is freedom of movement in different directions with a constantly changing rotation point, just to that extent the teeth are not guided in a rigid manner, in one direction only, by the relation of the cusps of the upper and lower teeth. If this freedom of movement exists and is functional in natural dentures in a considerable proportion of instances, and if it should be found that mastication is most easy and efficient when there is the greatest freedom of movement, what is the bearing of this fact on the use of articulators with fixed rotation points?

To anyone accustomed to thinking and working by the scientific method, according to Descartes' golden rule for the method which is never to accept anything as true but what is so obviously so as to leave no room for doubt, the extent to which methods of practice are accepted on supposed authority without ever being subjected to Descartes' test is simply astonishing. Practice based on conclusions drawn from an

insufficient number of facts and from unverified statements is the rule everywhere.

In the discussion which is to take place here, I am going to ask you to pigeonhole all statements that you do not know to be facts and consider the facts first, then see that the alleged facts are verified before you accept them. That is the scientific way of working and no conclusions are worth a moment's attention that are not reached in that way.

I have no conclusions of my own at the present time to offer, not a single one, but I have what appears to me to be important facts to present for which I ask your unprejudiced consideration. I have said that one of the suggestions which the experiment in my own mouth gave me was the possibility of great difference of freedom of movement in different mandibles and the bearing of this on articulation with fixed versus movable rotation points.

Acting on this suggestion, the first thing I did was to examine a large number of skulls for the purpose of observing the shape of the glenoid cavity and the relation of the heads of the condyles to their cavities. Obviously, freedom of backward movement of the condyle, from its normal resting position, depends entirely on the relation of the condyle to its cavity.

The result of this observation was to confirm what had been several times stated by other investigators, in fact to confirm, for my own purposes, what was more or less common knowledge to all students of comparative anatomy, viz., that there is a great variety in the shape of the glenoid cavity and in the relation of the heads of condyles to their cavities. In order to clearly show the differences, you will recall that I exhibited at New Orleans quite a number of sectional views of condyle relationship to glenoid cavity. In nearly all cases in which the cavity was deep, the space between the back part of the head of the condyle and the wall of the cavity was small. In most cases in which the cavity was shallow, there was far more space between the condyle head and the back wall of its cavity.

This would suggest the conclusion, although that conclusion would not necessarily follow, that in cases where the glenoid cavity is shallow, there is greater backward movement of the condyle from its resting position, and just to the extent that the condyle moves back on one side, while the opposite one is moving forward, will the rotation point of the mandible be toward a central position? In all cases in which there is as much backward movement on one side as forward movement on the other, the rotation point will be exactly in the center.

Confirmation, to some extent, of the hypothesis that a central rotation point would be found in cases in which there was marked freedom of movement of the mandible, was seen in many of the Eskimo's skulls. It is a matter of observation many times recorded that these northern

people have great freedom of movement of the mandible. I found many cases of wear of the teeth in the Eskimo's jaws examined, which indicated a central rotation point and in all of these cases the glenoid cavity was shallow and there was marked space between the condyle head and the back wall and floor of the cavity.

Clearly, then, the next step to be taken for the value of its practical bearing on our work in dental prosthesis was to secure accurate measurements of movements of the mandible in a large number of cases in living subjects. It seemed to me that in all methods hitherto devised for measuring mandibular movements, the possible margin of error was too great for thoroughly dependable results. I worked over this problem more or less for two years and devised a number of methods for recording these movements, one of which was endorsed by one of the highest mathematical authorities in this country. The method which I finally hit upon, the results of which I am to show you today, was suggested while watching my son, Dr. Percy Norman Williams, taking a record with a machine of his own invention, which is exhibited at this meeting, of casts of an upper and lower set of teeth in his practice of orthodontia.

I regard the method of making records of jaw movements which I have devised by aid of this machine as being as near to mathematical perfection as we shall ever reach. Its accuracy is represented by the mark of a needle point.

The method may be described as follows: A subject is selected with a full or nearly full set of teeth in which there is reasonably good occlusion and articulation. The movements of the mandible are first carefully observed, especially with reference to the relative position of the upper and lower incisors in all lateral movements. The reason for doing this will appear in a moment. Three wax bites are then taken in this way: Two or three sheets of ordinary impression wax are warmed and fastened together. A pattern is cut from this, somewhat larger than the size of the arch, but cut out in front so as to fully expose the incisor teeth while taking the bite. The wax pattern is warmed and a bite taken with the teeth in the normal resting position. A second bite is taken with about the amount of lateral movement used in normal mastication. A third bite is taken with as much lateral movement as the subject can make without obvious effort. The cutting away of the wax at the front so that I can observe the relative positions of the upper and lower incisors while the different bites are being made, enables me to see that the lateral movement is normal and to avoid any projection of the mandible.

The next step is to take impressions and secure casts of the upper and lower teeth. Two needle or pin points are prepared about half an inch in length and waxed in position, one exactly between the lower

central incisor, and the other in the place of the distal buccal cusp of the lower first molar, allowing these points to project about one-half mm. above the masticating surface of the teeth. (Figure 1.)

We are now ready to bring these models together in the three wax bites. The bites are slightly warmed and the models pressed firmly together in each of them in the order in which they were made: first, the normal resting position, then the small lateral movement bite is used and this is followed by the record of the wider lateral movement. If this procedure has been properly carried out, we shall now find recorded

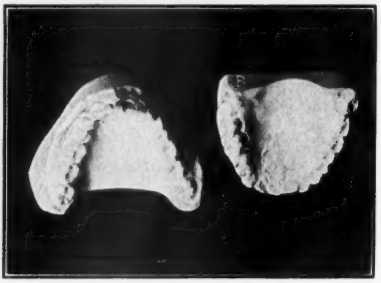

Fig. 1

Fig. 2

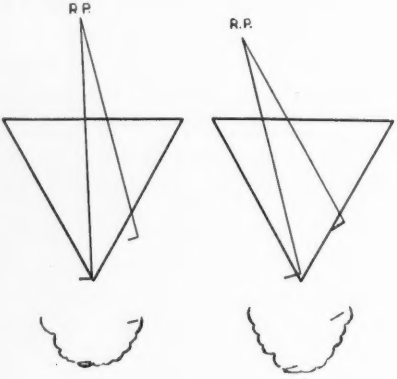

Fig. 3

on the upper plaster model, three needle-point marks in the incisal region and three in the molar region. This cast is now placed in the odontograph (Figure 2) and a record made on a card of the outline of all the teeth in the arch and the positions of the needle-point marks. This record is then accurately centered on the Bonwill triangle and the needle-point mark, representing the normal resting position of the space

between the lower central incisors, is placed exactly over the apex of the triangle. (Figure 3.)

All of the needle-point records are then punched through and recorded in the proper position with reference to the Bonwill triangle. When this record is made, we take a pair of dividers with needle points and insert these points in the impressions we have on the card, first in the incisal and then in the molar region. We take the small movement first. With the needle-point dividers firmly fixed in position, we place a thin steel straight-edge against the divider points and draw a line four or five inches in length. (Figure 4.)

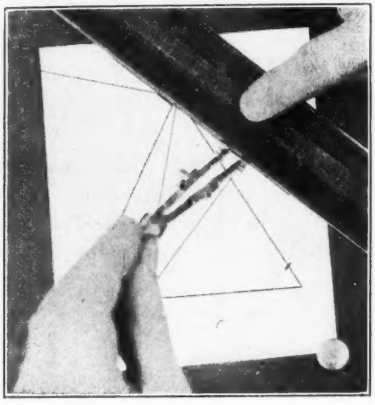

Fig. 4

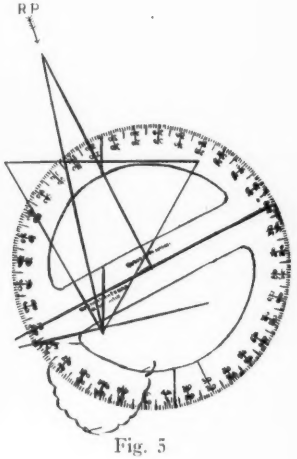

Fig. 5

We then use the record of the larger lateral movement and draw another line. Sometimes the two lines will correspond and sometimes they will not. When they do not correspond, we know that during the course of the lateral movement of the mandible, the rotation point changed and that the time when it changed was the moment when the backward movement in one condyle ceased because it had been forced back as far as it could go and the rotation point was thrown into the vicinity of that condyle.

Having drawn our lines in the incisal and molar regions we place the equator of a transparent protractor on these lines, (Figure 5) first on the incisal and then on the molar line, and mark the points of the poles of the protractor. With a straight edge we then draw lines through these points. The spot where the converging lines from the incisal and molar regions meet will, of course, be the rotation point for that mandibular movement.

Up to the present time, I have made sixteen records by this method. Four out of this number, or 25 per cent, showed a rotation point in

which we may call a central rotation area, that is to say, the rotation points were in varying positions nearer to a central line than they were to the region of the condyles. In all four of these cases, when the more extended lateral movement was made, the rotation point was thrown into the condyle region. (Figure 6.)

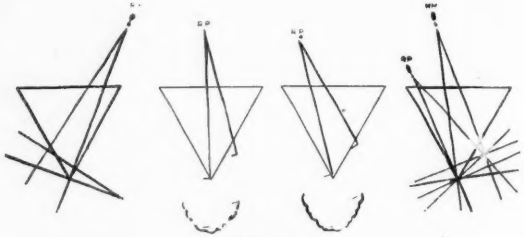

Fig. 6

In twelve of the cases measured, the rotation points varied but very slightly throughout the whole course of the lateral movement. The probability, based on the evidence which we have, is that in all of the cases in which there is no substantial change of rotation point during

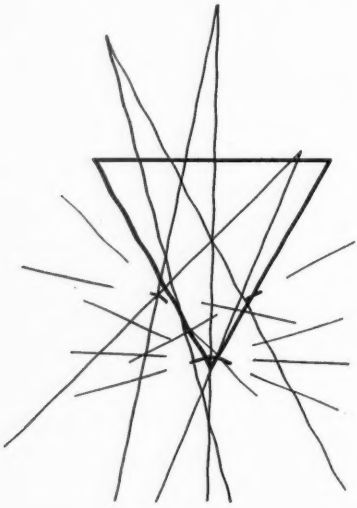

Fig. 7

lateral excursion of the mandible, the glenoid cavity is more or less deep and but little space between the head of the condyle and the back wall of the glenoid cavity. The hypothesis perfectly fits all of the facts in our possession. Some interesting individual peculiarities appeared

in these records. In the one now shown on the screen we see a fixed rotation point for the lateral movement on the side throughout the complete excursion of the mandible. (Figure 7.) This point is about two inches behind the condyle and almost directly in line with it. For the lateral movement on the other side, we start with a central or nearly central rotation point which changes, after the first small movement, to a point near the condyle. The question naturally arises, why should the rotation point on one side be so much farther behind the condyles than on the other?

This brings up another very interesting phase of this subject. It has long been known that in many, probably in nearly all instances,

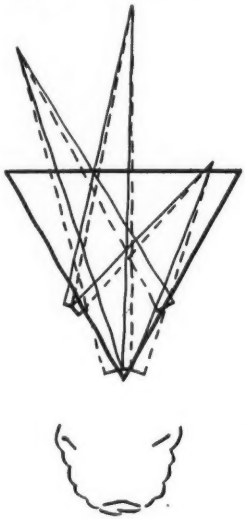

Fig. 8

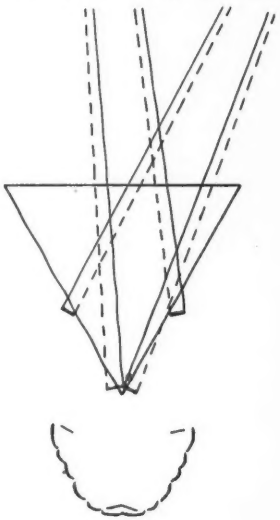

Fig. 9

there is more or less side slips to the whole mandible during lateral movement. This method of recording jaw movement, which I have devised, enables us to accurately measure this side slip of the mandible. The more there is of this side slip, the farther back the rotation point is thrown. In this case, in which the rotation point changed on one side but not on the other, I repeated my record to make certain that no mistake had been made. This subject was a dentist and after the second record had been made, I called his attention to the peculiarity. He then told me that he had always noticed that he had greater freedom of movement in one lateral excursion of the mandible than in the other. He attributed this to the fact that his teeth on one side of the arch were not in normal position. He was probably right in this conjecture. I show you the second record of this case (Figure 8) with the outline of the arch in which the irregularity on one side is seen.

Another interesting case, a record of which you see on the screen (Figure 9), shows marked variation of the rotation points on the right and left sides, but with so much side slip of the entire mandible that both rotation points are thrown entirely outside of the head.

In this view (Figure 10), we have assumed a usual rotation point with a lateral movement in the incisal region of 8.30 mm. This is much more than the normal movement of mastication but not more than is sometimes shown in making records of jaw movements. I have used the extended movement for the sake of showing the smaller movements in other regions. For the amount of movement recorded in the incisal region you see what the movement was in the molar region and what the backward, forward and side movements were in both condyles.

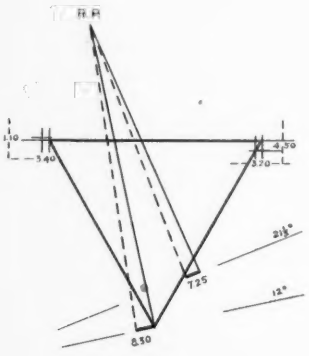

Fig. 10

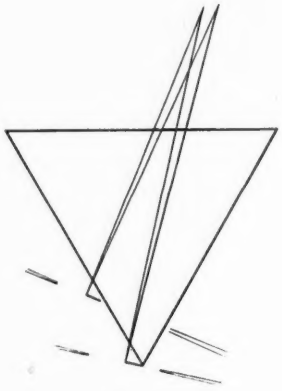

Fig. 11

In order to test the accuracy of this method of making records, I assumed a backward or forward position of the record of the needle point in the molar region of one-tenth of a mm. This amount of error changed the rotation point as shown in the diagram now exhibited. (Figure 11.) In no case in which I repeated my records was there as much variation found as is here shown.

The other records which I have to show, call for no other particular comment. (Figure 12.) In this one you see four records which represent about the average position in which I have found the majority of rotation points, that is to say, about 2½ inches back of a line drawn between the condyles and in varying distances from the center, but most frequently nearer a line running back of the condyles than the center.

I am, of course, well aware that the number of these records is too small for final conclusions as to their bearings on articular construction. But taken in connection with a study of the worn cusps of natural teeth they strongly suggest greater freedom of movement, as a requisite for

the most efficient mastication, than a rigidly fixed rotation point provides. If we study a large number of natural dentures in all degrees of wear, we are simply forced to the conclusion that increasing wear shows that the mandible must move, not only in more than one lateral direction, but also backward and forward. I have often observed a great variety of movements in mastication by watching living subjects. The direct bearing of this is on the importance of an articulator which shall be efficient as a grinding machine for producing freedom of movement in the cusp relationship of upper and lower dentures.

If an examination of a large number of glenoid cavities revealed practical uniformity of shape with considerable freedom of movement of the condyle in its cavity, then I should feel bound to agree with Dr. Hall and recommend an articulator with a central rotation point. But we find that this is not the case. It will probably be found that in a majority of cases in the so-called highly civilized races of today, the glenoid cavities are deeper and more contracted, antero-posteriorly, than in more primitive people.

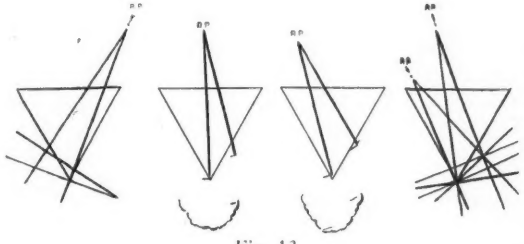

Fig. 12

There is a growing tendency, I believe, in this direction. Vigorous mastication tends to development of freedom of movement of the mandible and freedom of mandibular movement, especially in the early years of life, would tend to increase the free play of the condyles in their cavities. This would all be in the direction of establishing central or near-central, rotation points. But we find the modern tendency, as I have said, all in the opposite direction. Modern methods of cookery and habits of mastication do not encourage freedom of mandibular movement, but the contrary, and this means an increasing tendency for the rotation points of the jaw to be thrown outwardly.

These facts also seem to me to have a direct bearing on the question of shallow versus deep-bite teeth. It would seem to me that the modern tendency toward restricted lateral movement of the mandible would be the first justification that could naturally be urged for the use of deep-bite teeth. A study of comparative anatomy of the jaws and teeth tends to confirm this view. But then we find that the more restricted

the backward movement of the mandible, the more the rotation points are thrown outwardly which is exactly the opposite of Dr. Hall's method. In other words, there seems to me an anatomical inconsistency between the idea of deep-bite teeth and a central rotation point. If I were called upon to defend the use of deep-bite teeth, I should certainly do so on the ground of restricted mandibular movement and outward rotation points. I understand, of course, that you may grind the masticating surface of the teeth until you get freedom of movement on a central rotation point, even though the jaw may be actually working on outward rotation points, but that course does not in any way meet my scientific objection. It is open to discussion that a compromise between scientific accuracy and simplification of technic and convenience in working justifies the use of a central rotation point, but I do not see how it can be defended on purely scientific grounds with the facts now before us. I hope Dr. Hall will take all of these points up in his talk this afternoon.

But while the records of natural jaw movements do not seem to me to justify the use of an articulator with a central rotation point, I think all of the facts point to the probability that the highest degree of success in the functioning of artificial dentures will be reached when there is considerable freedom of movement of the mandible in all directions, even when the upper and lower teeth are in contact. All tendency towards rigidity and the forcing of movements in one direction only tends to cause irritation of the mucosa on which the dentures rest. In fact, I believe this to be the chief cause of the irritation so frequently met with. In the finest and most perfect natural dentures there is marked freedom of movement of the mandible in mastication.

The best artificial teeth that are made today permit this freedom of movement with but little grinding and at the same time when properly placed, the occlusion is more nearly perfect than is found in natural teeth.

In view of the fact that what is regarded by many at the present time, as the highest accomplishment in the technic of dental prosthesis is not being taught in practical detail, in more than one or two, if in any, dental colleges in the United States, it seems to me that the very first duty of this Society in the interest for which it was organized, is to work out such a simplified system of technic as will be acceptable to all, or a majority of the colleges, and at the same time be a system which will yield average results decidedly in advance of present average. That task should not be a difficult one, and to the end which such an undertaking would have in view, most of the facts which I have presented in this paper might be made contributory.

The National Dental Golf Association Tournament Money for Prizes

George Wood Clapp, D.D.S., New York

LAST year the money for prizes for the Golf Tournament was solicited from dental manufacturers, who were not eligible to play. After the event, some of us got together and talked this aspect of it over. We didn't see that it was any more fitting for us to ask the manufacturers to furnish our prizes than for them to ask us to furnish theirs when they play—and I am unable to learn that they ever made any such request.

During a visit to Chicago, I talked the matter over with Dr. Lewis, the Secretary, and offered to try to raise the necessary funds from our own ranks. He gave his approval and felt sure that the other executives would approve, also. Just to prove that I believed what I said, I made an offer on the part of the foursome which opened the tournament last year to contribute $50 for the purchase of one prize and to personally start the general subscription list with $25.

The following letter was sent to all the men who played last year at Boston:

> Dear Doctor:
>
> Last year the prizes for the tournament of the National Dental Golf Association were paid for by money solicited from the dental manufacturers. These men can not become members of the Association or play in the tournament, and begging for prize money from outsiders seems to some of us a rather cheap way of financing our sports.
>
> It has been found to be the opinion of a number of the members of the Association that we ought to pay for our own prizes, and the writer has offered to be the goat in raising the funds.
>
> In keeping with this idea, the four of us who opened the play for the day at Boston, Bradfield of Washington, Mallory of Toronto, Canada, Warren of Los Angeles, and the writer, have agreed to put up $50.00 with which to buy the capital prize, probably to be offered for the lowest net individual score.
>
> Money will be needed for enough other prizes, probably not less than $300.00. This should be in the form of cash in the hands of the Secretary in ample time for the purchase of prizes. Being the goat, I will head this list with $25.00 cash for this purpose.
>
> An appeal will be made through the pages of THE DIGEST to dentists who are interested, and the list of contributions received will be printed.
>
> Please don't write that you will decide about this next April or May or June, because you may not live till then or get to Milwaukee or be able to play. We might all drop dead before then, and if your score was anything like mine, it wouldn't be any great loss to the golfing world, either. Dr. Lewis is doing a lot of work without remuneration and must make his plans and get the prizes well in

advance. If you are coming in, take a header and come now! The water's fine!

As to amount, you may go as far as you like. No sum is too small, and, as far as I know, none is too large.

All checks should be made payable to the order of Ralston I. Lewis, to whom they will be sent as soon as they have been listed for acknowledgment and publication.

Yours very truly,

GEORGE WOOD CLAPP.

The following subscriptions have resulted and the checks have been sent to Dr. Lewis:

Aisner, Julius	$5.00	Hosley, H. E.	$10.00
Beiser, H. E.	5.00	Howe, H. L.	5.00
Clapp, G. W.	25.00	Lauckner, R. R., Jr.	5.00
Fancher, W. E.	5.00	Loeb, M. J.	5.00
Haverstick, E. E.	10.00	Van Loan, Morton	5.00
Hinman, T. P.	10.00		

In addition to this, our foursome, comprising Dr. Frank L. Warren of Los Angeles, Dr. W. K. Bradfield of Washington, Dr. Fred Mallory and the writer, is sending $50 for the purchase of one prize, which is to become the property of the man who wins it at Milwaukee next August.

If you approve this plan for raising our prize money and want to contribute, send me the check for acknowledgment here and forwarding to Dr. Lewis.

Go as far as you like and as soon!

April 12, 1921.

I acknowledge receipt of checks as follows, the money to be used to purchase prizes for the National Dental Golf Tournament, Milwaukee, August, 1921:

Aisner, Julius	$5.00
Beiser, H. E.	5.00
Clapp, G. W.	25.00
Fancher, W. E.	5.00
Haverstick, E. E.	10.00
Hinman, T. P.	10.00
Hosley, H. E.	10.00
Howe, H. L.	5.00
Lauckner, R. R., Jr.	5.00
Loeb, M. J.	5.00
Van Loan, Morton	5.00
Drs. Bradfield, Clapp, Mallory and Warren for one prize	50.00
	$140.00

(Signed) RALSTON I. LEWIS,
Secretary N. D. G. A.

DENTAL LAWS

Examination Acts in U. S. of America

By Alphonso Irwin, D.D.S., Camden, N. J.

CODIFICATION

An act to provide for examination of applicants to practice dentistry in Alabama. Law approved September 29, 1919.

Be it enacted by the Legislature of Alabama, as follows:

1. (a) That recognizing that dentistry is a specialty of medicine and surgery. . . . . .

(b) It shall be unlawful for any person to engage in the practice of this specialty, as either assistant or employee, or to receive any license required by law to practice this specialty, except he shall have passed the examination provided for by this act, and received the certificates, as herein provided, and any person practicing this specialty in this State, without such examination and certificate, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than one hundred dollars ($100) nor more than two hundred and fifty dollars ($250) for the first offense, and for the second offense a fine of not less than five hundred dollars ($500) or imprisonment of from one to six months in jail, or both, in the discretion of the court. . . . . .

3. Any person who shall hereafter desire a certificate to practice dentistry in this State shall file, or cause to be filed, with the Secretary-Treasurer of the Board of Dental Examiners of Alabama, an application in writing, in such form as may be required by said Board of Dental Examiners, and under oath, setting forth the name and age of the applicant, the school or college from which he or she was graduated; and shall appear at such time and place as may be designated by said Board of Dental Examiners, and submit to an examination, both practical and theoretical, as to his or her qualifications for registration as a licensed dentist.

4. No person shall be registered as a dentist under the provisions of this act who is not twenty-one years of age, and of a good moral character; nor until he or she may present to the said Board of Dental Examiners of Alabama satisfactory evidence that he or she has graduated in dentistry, and shall pass a satisfactory examination before said Board of Dental Examiners of Alabama, which Board shall have full power to determine what constitutes a reputable school or college of dentistry.

5. That is, if upon examination and investigation, said Board of Dental Examiners of Alabama shall determine that the applicant possesses the necessary qualifications as to character and education as herein provided, they shall enroll his or her name upon a register to be kept by said Board for the purpose, and issue to him or her a certificate, which said certificate, when recorded as herein provided for, shall entitle such person to practice dentistry in the State of Alabama. . . . . .

11. Each member of said Board shall submit his questions to the other members of said Board, and they shall decide on each question as to whether or not it is fair and practical.

12. That the Board shall furnish each applicant with official examination blank paper, of uniform size, which size shall not vary, but be kept uniform from year to year, and such official paper shall be paid for out of any funds received from fees paid by applicants. Before taking the examination each applicant shall register his name and post office with such other facts as the Board may require, and each applicant shall be given a number under which he shall be examined, which number shall appear on his papers, and his name shall not appear thereon. The date and the place of the examination shall be endorsed on the register, which must be kept securely by the Secretary of the Board. That within ten days after the grading of papers, each member of the Board shall forward all papers graded by him to the Secretary, who shall, within thirty days after the examination has been completed, deposit the entire collection of examination papers, including questions and answers, with a separate list of the names of those taking such examination, and the numbers under which the examination was taken, with the Alabama State Department of Archives and History. The examination papers so filed shall be preserved for five years, and shall at all reasonable office hours be open for examination by any citizens of this State. . . . . .

14. (Last half.) The said Board shall hold an annual meeting at such time and place as they may designate for the examination of applicants for certificates, and for the discharge of all such other business as may legally come before them; and may hold such additional meetings, on the call of the President of said Board, and the President shall call such meeting on petition of the majority of the members of said Board, as may be necessary for the examination of applicants for certificates, or for carrying into effect the Provisions of this act; and at these meetings said Board may transact any and all business that may legally come before them.

ARIZONA—LAW OF 1913.

4758. Any person who shall desire to begin the practice of dentistry in the State of Arizona, after the passage of this act, shall file

a sworn statement of his qualifications and shall make application to the Secretary of State for an examination by the Board of Dental Examiners, on a blank furnished by the Secretary of State, and shall pay the Secretary of State an examination fee of twenty-five dollars, which examination fee shall in no event be refunded if the applicant is eligible for examination; provided, that any applicant failing to qualify for license upon his first examination shall be entitled to one additional examination by the said Board of Dental Examiners at any subsequent meeting thereof, without charge.

4759. No person shall be eligible for examination by the Board of Dental Examiners who shall not: (1) Have been duly licensed to practice dentistry elsewhere in the United States; or (2) have a diploma from some reputable dental college, or dental department of a university.

4760. Examinations by the Board of Dental Examiners shall be of two kinds, viz: (1) theoretical, and (2) practical. The theoretical examination shall be written in the English language and consist of questions and answers upon such subjects as are included in the curriculum of reputable dental colleges; provided, that the Board may conduct additional examination, orally, on such subjects, and no member thereof shall be prevented from examining any applicant on all such subjects. The practical examination shall consist of demonstrations of skill in operative and mechanical dentistry.

In grading all examinations, the theoretical examination and the practical work shall be graded at fifty per cent. each; provided, that the Board may allow applicants who have been engaged in the practice of dentistry for five years, sixty-six and two-thirds per cent. for their practical work, and thirty-three and one-third per cent. for their theoretical examination.

It shall be the duty of the Secretary of State, upon presentation to him of a certificate by the Board of Dental Examiners, certifying under the seal of the Board, that the person named therein is possessed of the necessary qualifications and is entitled to practice dentistry in the state, to endorse thereon under the seal of the State of Arizona, a license to practice dentistry in the state.

ARKANSAS—LAW ENACTED FEBRUARY 17, 1915

Section 3. *Granting License, Registration, Examinations.* No person shall practice dentistry in the State of Arkansas or attempt to do so after the passage of this Act, without first applying for and obtaining a license for such purpose from the State Board of Dental Examiners, and registering such license as herein provided, and this pro-

vision shall apply to all persons, whether they have heretofore practiced dentistry in this state or not, except such persons as have been heretofore licensed and registered. Application for license shall be made to the said Board in writing, and shall, in every instance, be accompanied by an examination fee of fifteen ($15.00) dollars, which sum it is authorized to charge each applicant for each examination by said Board. The applicant must be at least twenty-one (21) years of age, of good moral character and reputation, and the application of each person seeking a license must be accompanied by evidence satisfactory to said Board that the applicant so applying is a graduate of, and has a diploma from, a reputable dental college, or the dental department of some reputable school or university.

Examination must be both written and clinical, and of such a character as to thoroughly test the qualification of the applicant to practice dentistry, and the applicant in his examination must make a grade or percentage required by the Board which shall not be less than an average of seventy-five (75) per cent, and the Board may also, in its discretion, refuse to grant license to any person found guilty of making false statement, cheating, or of fraud or deception, either in applying for license or taking said examination.

Section 9. *Examination Fee—Compensation—Secretary's Salary —Expense Report.* In order to provide the means of carrying out and enforcing the provisions of this Act, said Board shall charge each person applying to it for examination for a license to practice dentistry or dental surgery in this state, an examination fee of fifteen ($15.00) dollars, and out of the funds coming in possession of the Board under the provisions of this Act, the members of said Board shall receive as compensation the sum of eight ($8.00) dollars for each day actually engaged in the duties of the office.

CALIFORNIA—LAW APPROVED MAY 21, 1915

Sec. 6. Any person over twenty-one years of age shall be eligible to take an examination before the Board of Dental Examiners of California, upon making application therefor and upon (1) paying a fee of twenty-five dollars; (2) furnishing satisfactory testimonials of good moral character; and (3) furnishing satisfactory evidence of having been graduated from a reputable dental college, which must have been approved by the Board of Dental Examiners of California; provided, that after August 1, 1918, he shall also file his diploma or certificate of graduation with recommendations from a high school accredited to the University of California or any other university of equal standing; or a certificate signed by a State Superintendent of public in-

struction, or similar officer, to the effect that such applicant has had scholastic preparation equivalent in all respects to that demanded for graduation with recommendations from a high school giving a four-year course of instruction in the state from which such certificate is issued; (4) in lieu of such diploma or certificate from an accredited high school, such applicant, after said date, may and with like effect furnish to said Board of Dental Examiners a certificate from the Board of Dental Examiners, or similar official body, of some other state in the United States, showing that such applicant has been a duly licensed practitioner of dentistry in such other state for a period of at least five years; provided, however, that every person actually engaged as an apprentice to a regularly licensed dentist who has practiced in the State of California for ten years or more shall be eligible for examination, if, within thirty (30) days after the passage of this act, he shall file with the Secretary of the Board an affidavit stating his name, age, the length of time for which he has been actually apprenticed and with whom; and who, at the time of his application for examination, shall show to the satisfaction of the Board that he has served an apprenticeship of at least five (5) years and is a graduate from a high school or similar institution of learning in this or some other state of the United States requiring a three (3) years' course of study; and provided, that no examination shall be given to an applicant claiming the right to take the same as an apprentice later than December 30, 1915.

Sec. 7. The examination by the Board of applicants for license to practice dentistry in this state shall be sufficiently thorough to test the fitness of the applicant to practice dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, histology, physiology, anaesthesia, materia medica, pathology, bacteriology, therapeutics, oral surgery, chemistry, metallurgy, operative dentistry, prosthetic dentistry and orthodontia; the answers to which shall be written in the English language. Said written examination may be supplemented by an oral examination. Demonstrations of the applicant's skill in operative and prosthetic dentistry must also be given. All persons successfully passing such examination shall be registered as licensed dentists on the Board register, as provided in section three, and shall be granted by the Board a license to practice dentistry in the State of California. When a candidate for a license shall have received a grading of eighty-five per cent or above in any given subject, he shall be exempt from re-examination on that subject in subsequent examinations before the said Board held at the first or second meeting thereafter. Any member of the Board may inquire of any applicant for examination concerning his character, qualifications or experience and may take testimony of any one in regard thereto, under oath, which he is hereby empowered to administer.

COLORADO—LAW EFFECTIVE JULY 6, 1919

Section 2074. Any person desiring to practice dentistry in this state shall first submit to an examination before the State Board of Dental Examiners of this state, touching his or her qualifications, and every applicant for such examination shall, with his or her application for examination, submit to the said Board, as a prerequisite of such examination, a diploma of graduation of some reputable dental college, dental school, or university dental department, duly authenticated by the laws of this state or some other of the United States. (Law of '97. Page 145, Section 4.)

Section 2075. Any and all persons possessing the diploma prescribed by law, upon deposit of the examination fee, shall be examined by said Board, at such time and under such rules as said Board may prescribe, upon the science and practice of dentistry; and all who are found qualified, if of good morals and character, shall receive a license from said Board to practice dentistry in this state.

CONNECTICUT—LAW APPROVED 1917

Section 5. Every applicant for a license shall be examined by the Dental Commissioners as to his professional knowledge and skill before such license shall be granted; such examinations shall be conducted in the English language, and they may refuse to grant a license when satisfied that the applicant is unfit or incompetent; they may for cause revoke any license that has been granted and may prohibit any dentist in practice from further practice, on proof that such dentist has become unfit or incompetent.

Section 9. Upon the payment of a fee of twenty-five dollars, the Dental Commissioners shall, at their meetings, examine applicant and grant licenses to such applicants as they shall find qualified. An applicant who fails to pass a satisfactory examination shall be entitled to a re-examination at the next meeting of the Commissioners, without payment of a fee, but for any examination at a subsequent meeting, a fee of five dollars shall be paid.

DELAWARE—LAW APPROVED APRIL 19, 1917

886. Section 3. No person shall practice dentistry in the State of Delaware or attempt to do so after the passage of this Act, without first applying for and obtaining a certificate for such purpose from the said State Board of Dental Examiners, and registering such certificate as herein provided, and this provision shall apply to all persons, whether they have heretofore practiced dentistry in this state or not, except such persons as have heretofore obtained a certificate to practice den-

tistry from the said State Board of Dental Examiners. Application for such certificate shall be made to the said Board in writing, and shall, in every instance, be accompanied by an examination fee of twenty-five dollars ($25.00), which sum it is authorized to charge each applicant for each examination by said Board. The applicant must be at least twenty-one (21) years of age, of good moral character and reputation, and the application of each person seeking a certificate must be accompanied by evidence satisfactory to said Board that the applicant so applying is a graduate of, and has a diploma from, a reputable dental college, or the dental department of some reputable school or university.

Examination must be both written or oral and clinical, and of such a character as to thoroughly test the qualification of the applicant to practice dentistry; and the applicant in his examination must make a grade or percentage required by the Board which shall not be less than an average of seventy-five (75) per cent, and the Board may also, in its discretion, refuse to grant a certificate to practice dentistry to any person found guilty of making false statement, of cheating, or of fraud or deception, either in applying for such certificate or taking said examination.

DISTRICT OF COLUMBIA—LAW AMENDED FEB. 5, 1904

Section 3. That it shall be the duty of the Board of Dental Examiners, . . . third, to test the fitness and pass upon the qualifications of persons desiring to commence the practice of dentistry in said District after the passage of this act, and certify to the Health Officer for registration such as prove, under examination in theory and practice of dentistry, qualified in the judgment of the Board to practice dentistry in said District.

(To be continued)

Ethical Parables

Number 12

By George Wood Clapp, D.D.S.

At last the philosopher found the dentist who could answer his question as to what constituted a demonstration of ethics in dental practice. He was quiet, easy mannered and apparently prosperous.

"The application of ethics to practice," said he, "includes far more than we were taught in college. It consists in knowing what service costs, and selling it at fees that make it possible for the dentist to meet all his obligations by a number of working hours which will not affect his health; which will place his own financial affairs in such shape that they will not cause him anxiety nor thrust themselves into his working time; which will allow him to attend the necessary meetings and possess the proper books and magazines; and enables him to give to each patient his undivided and unhurried attention as the case requires.

"The dentist might do all these things and still be unethical by withholding from patients something that was their due.

"Ethics is part of the spirit of a man. If the man is over-worked, hurried in his service, worried by unfavorable financial conditions, and hopeless of material achievement for himself, ethics will get small chance for expression in service however great his desire.

"If the man will first organize his own affairs to permit rest, leisure, aspiration and deliberate service, he may be ethical if he will.

"Ethics is the expression of a fine spirit, working unhindered, in helpful service."

Twelfth of a Series of Twelve Parables

Planning for Success

By J. E. B.

When I read that description of "Dentist B." in success questions, I said "That's me all over."

My wife and two children are completely dependent on me, but I in return am completely dependent upon my wife as buyer for the entire family. By buying clothing six months in advance of the season, and staple foods in harvest time, she saves as much as 100 per cent.

In case of my death I believe I am bound to provide for my children's support until each child is eighteen years old, at which age they should have completed their high school education. Further education is possible by their own endeavor.

I can live comfortably in a town of 5,000 inhabitants, not owning my own home, and provide for the future of my family on $3,000 a year.

I certainly would consider myself a failure in life if I died without having made provision for the family's future. Is any dentist in the United States entitled to a reputation for success if he has been too boneheaded and inconsiderate of his wife and children to figure out a way to protect them, having had $3,000 a year with which to do it?

Here is the scheme we have: In the first place it is granted that Dentist B.'s wife is a good wife and mother, which means that she cooperates and permits her husband to safeguard her future. Any wife who spends her husband's savings to gratify her craving for extravagant clothing may lay the blame for her stranded state upon her own shoulders. We live on $2,000 a year, but for those who cannot see how we do it, let us assume that it requires $2,400. This leaves $600 to safeguard our future. I can buy $30,000 in straight life insurance at an annual premium of $283.50 by taking a policy called the graduated premium policy, the cost of which increases a dollar a year per thousand. This sort of policy is as a rule convertible without medical reexamination into any standard kind of policy at any time, and is intended for just such men as Dentist B.

The remainder of my $600 savings may be placed in a savings account to serve as "home-made sickness and accident insurance," paying four per cent and costing nothing. It may also be used to purchase U. S. Liberty Bonds, which at market price yield about six per cent.

Nevertheless, I would prefer, as early as my finances permitted, to convert the straight life insurance into an endowment policy; but if unable to do so, I would invest the unused remainder of the $600 savings in a short-term endowment policy, thus increasing the protection to my family, and providing funds ten or twenty years hence to pay the increasing premium of my straight life insurance. If my earnings increased, I would invest in small endowment policies from year to year,

falling due at the age at which it is befitting and proper for an elderly professional man to reduce his practice. Finally, endowment insurance serves splendidly as insurance against foolish investments and speculation in the stock market, for which the dentist, the school teacher, and the preacher are notorious. Endowment insurance is a little better than a three per cent investment anyhow, and surpasses the profits of the average amateur speculator.

Incidentally, a little testimony gathered in a confidential manner by THE DENTAL DIGEST from ethical dentists of middle life, on the subject of "playing the market" might make interesting reading.

I talked to a happy dentist, seventy years old, who boasts of his health, he having never done an hour's work in the evening, and who started practice after his fortieth birthday. "How did you do it?" I asked. He answered, "Every time I gathered a little money I took out a small endowment policy, and now I am the happy recipient of a thousand dollars every third year or so; it's like a gift from father."

The plan is simply investment in insurance for protection against poverty and the glib-tongued stock seller.

The ex-service man of the late war would do well to make inquiry at the nearest city Red Cross headquarters concerning his war-risk insurance. Reinstatement is possible, and the rates on endowments are attractive to one who cares even a little for his own welfare in final days of life.

Free Examination—Is It Ethical?

By J. F. Nelson, D.D.S., Cottonwood Falls, Kansas

The editor of DENTAL DIGEST, in his "Ethical Questions," asks "If Ethics applies equally to all patients, how can a dentist give the cream of his knowledge and experience free of charge to persons who do not patronize him, as in examinations and consultation . . ."

By "consultation" I understand our being called in on another dentist's or physician's case to advise or help with the case. Surely we all charge for this work unless we have an understanding of reciprocation with the dentist or physician. I can think of very few cases where persons who do not patronize us would ask for examination unless they were purposely giving us an opportunity to make them our patrons. In such cases as pyorrhea and orthodontia, if we do not do this work, we should say so and refer them to a specialist. Then if they insist upon our thorough examination and opinion, they expect to pay for it and we should make a charge. But in the ordinary run of prospective and regular patients, I think fully ninety per cent of dentists make no charge for examinations and necessary discussion of ways and means.

Why? Because we need new patients--new business—and this is one of the best ways we have of securing it. Outside the professions we would call it advertising and charge it to advertising or publicity expense. And, if we were not so pesky narrow and prejudiced in the professions, we would do the same. Every so-called ethical dentist advertises in some way. Some through different organizations; some by being good mixers; and some by free examinations.

We acknowledge and prove to the world every day that we are poor business men. At the same time, we admire our friend merchant, who has built up a good business alongside of us. We know he is a good business man. If we wish to be better business men, we must learn from good business men. So let's see how this merchant built up his good business. Let's see also who paid his publicity bills, and if he can be rightly accused of disregarding ethics. When his business was started he had to get people in and show them his goods. He had to pay this expense out of his own pocket, but he was a good salesman and had the proper kind and quality of goods, and he sold them and collected for them. These first customers recommended his store and others came and he treated them the same. By this time part of the profits from these early customers paid the publicity bill. In other words, he was using some of the money paid him by his regular customers to get new business. Who could call this unethical (dishonest)? Why, then, is it any more wrong for a dentist to use a part of the money collected from regular patients in paying for time used in free examinations in an attempt to get new business?

All of our regular patients, at some time or other, had their first examination at our hands. Who paid for this examination? If they came when we were just establishing ourselves, we, the dentist, paid it, and gladly. If they came a little later on, those patients who had already been to us paid it. So, after all, we can trace the thing back and find that for every time a patient helps pay for another's free examination, somewhere in the past someone has done the same thing for him or his.

From a business standpoint, it cannot be unethical to do a thing in dentistry that is done and considered right and legitimate in all lines of business.

From the viewpoint of the patient, it cannot be unethical to do a thing in dentistry that is done to them daily by all other business men with whom they deal. A thing that they know must be done unless the entire system of business be changed.

What would you think, Doctor, if your clothier would say to you, "I must make a charge for showing these suits to you because it takes my time, and I have spent much time and money in preparing myself for the proper performance of this duty?" You would think something

like this: "Of course I expect to pay for this time and knowledge, but why in thunder don't you include this item in figuring your per cent of profit, like all other business firms do? Why the new departure?" I think this is about the way our patrons think of us when we charge for examinations.

Now comes our viewpoint—the professional viewpoint. What a multitude of things—silly things, sinful things, narrow things, we make this word "professional" cover. We refuse the cloak of common business sense and take that of professionalism and wrap it about us so snugly and closely and turn the collar so high that we can see out but dimly, and the good, wholesome air of the big business world can penetrate scarcely at all.

Why should I, because I am a dentist with a little office room on an upper floor furnished with the equipment of my profession, with my diploma, and with my ability to do dental work—why should I say to the banker in his spacious offices, the merchant in his fine store, or even the successful garage man, "I do not recognize the laws of business you fellows follow. You spend hours in talking up new business, or making a sale, and make no charge for it; I charge for time thus spent. You spend large sums in newspaper advertising; I would starve first." If these men took any notice of my plaint, other than pity or tolerance, they would boom "Why?" and my answer would be, "I am a professional man; it would not be ethical." Would this explanation be satisfactory to them? No. Even after a thorough study of the words "ethical" and "professional" on their part, the answer would still be no.

Why should I, because I am a dentist, see my family go without the things they ought to have because professional ethics says I must not go out and say to the world in whatsoever way I choose, "I need more business and I feel justified in asking for it because of certain capabilities."

Men of dentistry, it is my sincere belief and experience that all persons, outside the members of certain professions, have always failed and will always fail to comprehend our exalted theories of ethics. Even our own manufacturers, I am sure, would not care to tell us their innermost thoughts concerning our methods of business. When they have something to sell us, they demonstrate it, but do so free of charge. They believe in free examination in an attempt to get new business.

Of course, it is only natural to want to make as much money as possible. But are we not very likely to be "Penny wise and pound foolish" if we charge for examinations. We would have to make a good many examinations to make up for one good job lost, because of charge for examination. If we need business we should not do things that tend to drive business away.

The argument that it will keep shoppers away is offered, but shall we not expect shoppers? We shop. The different members of our family shop. In return we must be willing to tolerate some shopping. And many a time, if we will but talk honest to goodness dentistry to them, "fools who came to scoff will remain to pray." As our practice grows and we work nearly entirely by appointment, shoppers automatically become fewer and fewer.

Then, since our patrons come from among people who know not what we mean by "professional ethics," would we not be wise to drift a little into the stream of ordinary business and let them know that we are willing and anxious to examine and discuss their defective dental organs, simply as a means of obtaining their business? This they will understand and appreciate. It also gives us a wider field in which to preach and do good dentistry, and unless we have grown exceedingly selfish and egotistical, we must realize that therein lies our duty, big and far reaching.

Dental Ethics As It Might Be, Is, and Should Be

By C. E. C.

Ethical Questions are, like most questions these days, so asked that any complete answer is impossible unless they are explained, restated or simplified.

Three viewpoints from which to reply present, however: First, as asked, these questions are answered in advance. If dental ethics is a sort of spotlight focussed on the patient, it is, if analogous to any spotlight at present known, a system of procedure in which all rays of dental light and service must be directed toward them alone, and any professional, personal or business matters that might justly be considered as modifying service to them must, under this system of "Ethics," be wrong. Thus, as premised, dental ethics does not shine for the benefit of others than the patient; it does not include fellow practitioners and may exact service and speech that will discredit them; it may, but will not necessarily discredit dentistry as a profession, does not include those for whom and to whom the dentist is responsible, and does make the patient "the whole thing."

However, this is not Dental Ethics "as it is" but "as it might be," for most if not all available codes that from their relation to dentistry are called dental, but which almost invariably so lack relationship thereto as to be rather remotely "Ethics," do not focus their light on the patient. Instead, they embrace as it were the patient, including his or her pocketbook, the dentist, whether worthy or not, his fellow practitioner, good or bad (as represented by fellow subscribers to the

code, at least) and such financial, personal and professional matters as the special code may choose to dogmatically state to be part of its "ethical" standards.

Under them, in consequence and therefore under Dental Ethics as such, exist a second series of answers, as follows:

As it is. Dental Ethics shines, nominally at least, for the benefit of the patient and includes others. Among these others are fellow subscribers to the code and the profession as represented by such who are nominally protected from service or speech by one that will discredit another.

To the extent Dental Ethics prescribes or prohibits financial and business procedures, those for whom and to whom the dentist is responsible are included, and in as much as these other matters are included the patient is necessarily not "the whole thing."

These two series of answers cover the ground of Dental Ethics as it might be and as it is; neither of them is a correct answer from the viewpoint of Dental Ethics as it *should be.*

Generalities never can be completely true; there always appear or seem to appear exceptions that disprove any broad statement, but which in reality emphasize if they do not prove the rule.

With this granted, however, it may still be broadly stated that Dental Ethics if really true to its name, and what it should be, must present the following aspects, and thus presents the third series of answers to the questions:

It must consider the patient, of necessity.

It must include the dentist.

It must preclude any service or word that will designedly discredit other practitioners as individuals.

It must enhance and never discredit the profession, as such.

It must consider, if not include, those for whom the dentist is responsible—his family and creditors, for instance.

It must tend to make the dentist and his professional brothers better men and not machines, property men, manikins, or fakirs.

Whether entirely practical or not this kind of ethics is not altogether chimerical.

Patients can be and should be as far as humanly possible correctly advised without being subjected to experiments, dental fads, or services of questionable value.

The dentist can be and should be enabled to render this kind of service without thought or fear that any other "reputable" dentist will by service or word be able to even temporarily discredit him, while such service of necessity can not discredit the profession.

Such Dental Ethics can and must include enough business ethics to permit and demand that the dentist receive a fair and apparently liberal

fee; for insufficient pay, in these days at least, leads to financial, physical and mental deterioration and consequent inability to perform; and as fees must be considered, money and all that money can rightly be esteemed to mean to the dentist, his family, business associates and creditors must be included.

Practically such "Ethics" appears to be practiced by an ever-growing number of dentists; some, subscribers to an established "code"; more, not; for while fads, fancies, philosophies and morals may be concrete and inflexible, Ethics is a general principle not possible of the same exact application in even similar conditions, and no "code" is or should be an exact map or chart but rather a light, not focussed upon anyone or thing, but shining that all by it may more clearly see and more completely act in accordance with the principles a code should not formulate but only draw attention to.

Are We or Are We Not?

By A. H.

Is the modern dentist as wonderful as the college of today would have us believe? Are all the latest wonderful inventions as wonderful as they seem? Are the dental rubbers and goods in general as good as in the "good old days?"

"Why do you write such rot?" says my city dentist friend. There is no comparison. As I am only a "country dentist" maybe I am all wrong, but I have had my city friend give me wonderful advice on lots of other matters (very often financial advice), but as it stands today he has nothing to show for 15 years of practice but possibly a good time. I have been able to save and safely invest enough so that I need not worry over coming "rainy days."

But I am getting away from my subject. My reason for writing this article is what I see myself in this hustling factory town. Now there is an office building on the very spot where Farmer Brown had his cornfield when I was a boy. The shade of the old oaks where we spent the hot summer afternoons is now no more, but instead we find apartment houses. Our swimming hole is a big factory wharf, and so on everywhere. In those days, about 30 or 40 years back, we had but two dentists, and that far back and in such a "water tank" town they surely must have been real "country dentists."

One of them got in ahead of the law and had no degree, having worked for another dentist and just opened up for himself. This was not known to the public, but since getting into the profession I found it out. Now that the town has grown big I am surrounded by office buildings, and in these office buildings are dentists a-plenty, some

with a beautiful suite of rooms containing all the latest and best in dentistry, and their diplomas on the wall say they are graduates from the biggest and best dental colleges.

Dentistry, like the city, must have advanced wonderfully in these 30 or 40 years. This is where my query comes in, "Are we or are we not" as wonderful as we think we are? This dentist who had no degree, no diploma and who just opened up for himself, did some dental work for me in 1893, amongst which was two gold crowns, a very difficult gold filling in a central tooth, including the biting edge, and some other smaller fillings. In 28 years the crowns haven't come off, not worn out —teeth have not bothered me a particle in all that time. The gold fillings are all in good condition, the gold hasn't even flaked off any. X-ray shows nothing wrong at the apices. The central was devitalized for gold filling and it hasn't discolored. In the course of a year I see many of his former patients, and his work in their mouths is just as good. The other country dentist I don't know so much about for he never did any dental work for me but as he has been dead for about 25 years naturally there isn't as much of his work around to see, but what I do see frequently is in good condition. In my own family, my father and mother both have false teeth he made over 40 years ago, and they are still in good condition. They have never broken or even a tooth come off in all that time.

Again in my own mouth I have some dental work done in 1902 and 1909 by a man who has a chair in one of our big dental colleges, and is the author of one of our leading textbooks used in all our big dental colleges. The gold crown he made me in 1902 comes off about every year or two. One of his gold fillings came out years ago, and two smaller ones have flecked off badly. A tooth he devitalized in 1909 is almost black, frequently gets sore and ulcer forms. A porcelain filling I had put in by another very prominent man in the dental world comes out about every year or two. The last time it was put in by a 1918 graduate, and it stayed just one month (and I wear rubber heels).

In the plate line I see the same, plates made by these old timers from 25 to 40 years old looking and wearing better than some of my own not over 10 to 15 years old. I see the work of the younger graduates going to pieces in a few years. Men with the latest appliances and diplomas from our best dental colleges, men who charge high fees for prosthetic work they don't do, and many couldn't do, but who must rely on a dental laboratory to do it. I see plates with teeth off but a few years old. I see crowns worn out in a year or two. I have people complaining of this and that dentist who put crowns on their teeth and they stayed on but a few months.

Isn't there something wrong when a patient comes into my office and asks, "Doctor, do you put in the good old fashioned gold fillings? My

dentist doesn't believe in them and I don't believe in what he used for they only stay in a few months." Her dentist is the leading modern dentist in the town where she resides.

"A Hopeless Case"

By Dr. Guy B. Harvey, Green Bay, Wis.

I was much interested in reading the article "Solving the Problems of B." by Dr. Bremner of Chicago. It is well written and should be heeded by all.

However, the Doctor leaves something still to be added to make it complete.

I would suggest that he advise the young dentists especially to take more than a passing interest in their plate-work, to make their own plates and to learn how to make them and to know when they are properly made; to not promise all kinds of satisfaction to prospective patients to get the business, but when he does get it hold himself strictly responsible for its perfect mechanical construction.

After 30 years' continuous practice I believe that the laboratory is the best paying part of the office.

But I must take exception to Dr. Bremner when he says, "No man who earns $3,000 per year from the practice of dentistry can have much enthusiasm for his profession." I hold, perhaps wrongly, but nevertheless persistently, that a dentist is a workman, especially skilled it is true, but a workman just the same, and I have known some wealthy ones who held the same opinion, and a man who has so little control of himself and family that cannot save at least and invest safely $1,000 out of $3,000 every year, is a hopeless case.

Facts, Figures, and Success

By C. P.

I shall give you a few facts and figures regarding the practices of A and B, who are old friends, each of whom thinks himself successful from his own point of view.

A is a big success "financially," while B has aimed at improved technique and results, and has not thought so much of what profits he could make. A is now 27 years of age, having been graduated at the age of 22. He did the four years course at the local Dental College, and for some years previous was engaged in a wholesale emporium. It was there he gained his "business sense." A is the only dentist in a

small country town in Australia, an hour's train ride from a large city. He has been happily married for a year, and is quite satisfied to spend the rest of his life in that same town. He does good, honest work, fees not too high, but his patients get good value for their money. He does not do muscle-trimmed impressions for pyorrhea. He uses a foot engine and a foot lathe, although electricity has recently been installed in his town. He does not attend society meetings, because, as he says, his patients are satisfied, and new fads mean new outfits, which cost money. He is going to buy a Ford car, though I tried to tell him a Ritter engine and lathe would be a better investment.

At the present time A's income is 70 pounds (sterling) per month, and his average expenses (including *everything*—rent, depot bills, etc.) 9 pounds per month. He keeps no nurse, and does all his own mechanical work. His wife occasionally helps in the workroom. He is thus making about 700 pounds per annum. His time is fully occupied and he is taking on a junior mechanic next year. He is happy, his wife is happy, and his patients are satisfied and speak well of him. He certainly is not very much interested in his work, except in so far as it earns him a living. I recently had occasion to remove some teeth he filled two years ago (the patient developing pyorrhea), and I found good root fillings, and good, well contoured amalgam fillings in the teeth. So I can vouch for his good work.

I will now tell you a little about B, who is a few years older than A, and started dentistry three years earlier. He never had any business experience, but was a demonstrator in a school laboratory. He has always been keenly interested in dentistry but says that since he has been taking THE DIGEST (1918) he has paid much attention to the financial side of the profession.

B's gross turnover is at present 100 pounds per month, and his expenses 47 pounds per month, leaving a net annual income of about 650 pounds. His net income last year was 540 pounds, not counting new outfit as part of his expenses. B recently had a Ritter Unit installed, and of course cannot count the deposit and monthly instalments as part of his monthly expenses—as the Unit costs in Australia over 400 pounds—nearly a year's expenses.

B does full upper and lowers as recently demonstrated by Mr. Fripp of De Trey & Company, and has a complete Fripp outfit, Trubyte Mold Guide, Wavrin Guide, etc., and is continually improving his technique, and raising his fees accordingly.

B is not married, but hopes that the improved methods will bring a more wealthy clientele. He is located in a good class residential suburb, just four miles from the G. P. O., Melbourne. American dentists have visited B's rooms and say they have seen no more finely equipped or better appointed rooms anywhere in the world.

B loves his work and makes it his hobby. He now plans to buy an X-ray outfit and after that hopes to save up for a "home," which, of course, will cost him more to purchase and keep going than it does A, because living is dearer in town than in the country.

B feels successful, because he does his best possible work, and thanks to such firms as De Trey & Co., has now the means of getting much higher fees. He is confident he will soon do 2,000 pounds gross per year, with very little increase in his present expenses. Personally, I don't think A will ever do much more than 1,200 pounds gross, if he does that, as he can't raise fees much. If he has to have a mechanic, he would not make more than 1,000 pounds per annum net.

In closing I will say that B was ahead of his final year at the Dental College in both written and practical work.

Which of these men is the greater success?

PRACTICAL HINTS

This department is in charge of Dr. V. C. Smedley, 604 California Bldg., Denver, Colo. To avoid unnecessary delay, Hints, Questions and Answers should be sent direct to him.

Quick Repair for Porous Places in Plates.—Whenever you desire a quick repair for porous place in plate, cut out that part, save the fine powder, mix powder with synthetic porcelain, then fill cavity. After this has solidified and is polished it is very difficult to detect place repaired. Use rubber filings from some plate you are to repair.

C. I. Faison, D.D.S.

Editor Practical Hints:

I was very much surprised several days ago to note one of my friends, a dental practitioner, placing some used wax in the discard. After questioning what appeared to me as a very extravagant habit, it developed that this waste was nothing uncommon among our contemporaries. For several years I have been accustomed to dropping about five normal sized drops of sulphuric acid into the wax-pot preparatory to boiling and making sheets out of the wax, which I have found to be as fit for use as the wax one can buy as new.

J. Julian Fischman.

Editor Practical Hints:

(1) Boy, eleven years old. All upper incisors kicked out by horse and lost. How would you advise replacing the teeth?

(2) Girl, four years old. Practically all teeth decayed down to gum and suppurating badly. What would you advise?—J. A. E.

Answer.—(1) By clasp-anchored removable restoration; number, shape and position of clasp could be determined only by a study of the case.

(2) Advise change of diet. Stop suppuration by the use of Howe's silver nitrate and formalin reduction methods; Buckley's formocresol and thymolized calcium phosphate, or by extraction. Watch for eruption of permanent teeth and place expansion arches as soon as six-year molars and incisors are in place.—V. C. S.

Editor Practical Hints:

Being one of the younger practitioners, would like to have some information on following cases:

Patient, man 24 years old. After having lower left third molar extracted by conductive anesthesia, noticed that his jaws could not be opened hardly wide enough to allow him to feed himself without much difficulty. After a short while jaws became about half normal, and are remaining so. Same change was noticed when lower right third molar was extracted by same kind of anesthesia.

Another patient, man about 38 years old. Had same extraction on right side, with same results, only more complicated. Upon becoming excited and opening his mouth quick and too wide, would cause it to remain stationary (at open stage) accompanied by excruciating pains lasting a second or two. When last heard from pains were leaving gradually, but mouth cannot be opened any wider than when pains were experienced. Would like to know what could be done to regain proper articulation of jaws.

ANSWER.—There is no way for me to know what was the cause in the cases you cite. I might say, however, that such a condition could result from the use of an old stock Ringer solution. Or, the use of old distilled water. It is best to distil your own water each day. Or, injecting into the muscle, or injecting too rapidly. The pressure should be very gradual so as not to distend or distort the delicate cellular tissue in the region of the injection.—V. C. S.

Editor Practical Hints:

I have been taught, and have been practicing with firmness to do the best for my patients. After extraction a denture should not be placed in the mouth until the alveolar ridge was well healed and rounded, this taking six months to a year's time.

I am a close student of impression taking, both of plaster and compound. Yet I have some failures.

There are some who talk and teach that a denture should be placed in the mouth waiting no more than two weeks or a month and even sooner, after extraction, in order to obtain the desired fit.

This has been against my way of thinking. But I can be shown. Would you please give me some light upon the subject, and your reasons.

WM. G. MOVIUS.

ANSWER.—I believe that the best results in denture work are obtained where the patient is not allowed to go edentulous for a single day. I get the best results where the buccal and labial process is resected back at time of extraction, gum trimmed to straight clean

lines and sutured. Impression taken immediately and cast poured with plaster with setting hastened by potassium sulphate. This may be separated in five minutes and a base plate adapted to the cast of Graft's base plate material. The six anterior teeth are fused to the base plate. Ridges are built up in the posterior region to establish occlusion with the jaws at normal rest. These base plates are worn when the patient leaves the office, maintaining the normal relationship of the jaws, preventing the sagging of the muscles and strain and change in the mandibular joint. With this temporary base plate the patient can go on about his business unembarrassed and suffering much less pain and discomfort—the base plate acting as a splint or bandage protecting the wound in the mouth from irritation from air and tongue and food pressure. These base plates may be worn indefinitely, from one to several weeks to meet the pleasure and convenience of patient and dentist.—V. C. S.

Editor Practical Hints:

I am doing all my extracting with ether and chloroform where there are any number of teeth, and I have one particular case to which I would like to call your attention and ask for advice.

Two months ago I extracted fourteen teeth for a lady patient about 34 years old, with chloroform. These teeth were affected with pyorrhea and were the only teeth she had. In three weeks her gums were perfectly healed and of a healthy pink color. At the end of the fourth week she developed a stiffening of the jaw similar to tetanus. I could do nothing to relieve this, so I advised ultra-violet ray treatments and she is now wearing her plates (a temporary set) until her jaw is in normal condition to get a permanent set.

I would like to know what caused this trouble as there was no infection or pus in the mouth. I was certain of this as I took five X-rays and no roots or pus could be found.—F. J. B.

Answer.—This stiffening of the jaw may have been due to the strain at the joint due to the lack of support for the jaw after the extraction of the teeth. Now that she has her temporary plates, if she keeps them in this strain will be relieved and the pain and stiffness will probably gradually leave.

Iodex massaged into the tissues, with the violet-ray or high frequency current, will generally give relief in such a case. Advise also hot applications and moderate but persistent exercise of the jaw at home.—V. C. S.

CORRESPONDENCE

Editor DENTAL DIGEST:

The enclosed circular letter is being mailed to all Dentists and M. D.'s and is the best we could do, and would have come around any way about as soon as it did.

It comes when most needed and will be more appreciated.

Yours truly,

P. S. C.

FEDERAL BOARD FOR VOCATIONAL EDUCATION
Division of Vocational Rehabilitation
Washington, D. C.

March 18, 1921.

P. S. Coleman,
Wilburton, Okla.

The Comptroller of the Treasury rendered a decision on August 21, 1920, that no part of the appropriation for the Federal Board for Vocational Education could be expended for necessary medical supervision and treatment, including surgical, optical and dental services and services of nurses and attendants for trainees undergoing training under the provisions of the Vocational Rehabilitation Act. It is greatly regretted that on this account the Board has been unable to pay a number of bills which it had incurred.

The 66th Congress, however, acting upon the Board's recommendation, included an item in the Sundry Civil Act which carries an appropriation for the specific purpose of paying these bills. The President signed the bill March 4. This appropriation becomes available July 1st, 1921.

The Board has vouchers on hand drawn in your favor. These vouchers will immediately be placed in process of payment and checks covering the amounts due you, will go forward July 1, 1921, or as shortly thereafter as possible.

R. T. FISHER,
Assistant Director for
Vocational Rehabilitation.

NOTE:—As the amount due physicians and dentists is several million dollars, we endeavored to secure an earlier payment, but the above arrangement will probably be entirely satisfactory to all interested.

P. S. C.

Editor DENTAL DIGEST:

I am enclosing a letter from the Secretary of War together with the answer. Although unfortunately this letter is couched on rather personal terms, yet the officers of the League know that it is intended for all our members, and I trust you will be able to print it together with the answer, which is intended to emphasize the more general phase of the document.

Thanking you in advance for the kindness, I am,

Very truly yours,

J. W. BEACH.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

The following letter from the Secretary of War came as an unexpected recognition of the services rendered by the League during the War. Attached also is the reply:

WAR DEPARTMENT, WASHINGTON

March 4, 1921.

Dr. J. Wright Beach,
Allen Street, Buffalo, N. Y.

My Dear Dr. Beach:

I desire to express to you the appreciation of the War Department of the services rendered the armed forces of our nation by the Preparedness League of American Dentists under your able direction as its Founder and President.

The loyalty, the meritorious character, and the magnitude of performance of the services rendered by the Preparedness League call forth the highest praise upon the Dental Profession in general and upon you in particular.

In this I desire also to add my personal appreciation of the patriotic services rendered by you as Founder and President of the Preparedness League of American Dentists.

Cordially yours,

JOHN W. WEEKS,
Secretary of War.

Buffalo, N. Y., March 12, 1921.

Hon. John W. Weeks,
Secretary of War,
Washington, D. C.

Honorable Sir:

The Officers of the Preparedness League of American Dentists are deeply sensible of the distinction you, as representative of the Government, have conferred upon the organization, as per your letter of March

4th, the contents of which will be forwarded to as many as possible of our 19,000 members, and we beg to assure you that the service rendered to our Government and to our soldiers was accomplished through the influence of the unselfish spirit which prompted the American people to the highest service during our greatest crisis.

It also is gratifying to us to know that this recognition came as one of the first official acts in assuming the duties of your most important office.

We beg to remain, Honorable Sir.

Very truly yours,
Preparedness League of American Dentists,
J. W. BEACH,
President.

Editor DENTAL DIGEST:

Thousands of teeth are sacrificed by the forceps that might just as well be saved. The time has come to cry a halt, in indiscriminately pulling out teeth. Too many ills of the flesh are blamed on the teeth.

With due respect to most dentists and physicians, it is believed that the public is being needlessly frightened for the sole purpose of getting a big fee. If the dentist is conscientious, as to his patients' welfare, there will be less extractions in the future.

The value of the X-ray is in its *use*, and not as an instrument for commercialism.

R. W. BAILEY.

Editor DENTAL DIGEST:

I thought I had done about everything, but this was something new for me. I met a patient a few days ago for whom I had recently inserted some fillings. Upon meeting me he said: "Say, Doctor, do you remember those teeth you half-soled for me a short time ago?"

I remembered doing the filling but couldn't catch his drift about the half soles. He explained that "every time he closed his teeth together they squeaked like a new pair of half-soles."

Some of you old timers who think you have done everything possible, if you have not done any half-soling in the mouth as yet there is still something left for you to do.

M. H. G.

Editor DENTAL DIGEST:

I note in the March issue an article by E. A. Randall, D.D.S., headed "Nerves?"—Go Back To Nature. It might be of interest to some readers of the Digest to know the hobbies of some of the other

dentists—the hobbies that take the dentists away from their professional worries and "back to nature."

My hobby is raising milk goats. I started in about five years ago by purchasing three, as we needed the milk for our baby's use. I found the milk superior to cow's milk, even for family use, and also discovered that milk goats make the finest pets and are profitable as well as giving healthful, outdoor exercise and diversion for the mind.

I started in with the three on a town lot, but since then we have built on a block of ground overlooking the town and I now have twenty-eight, young and old. There is no limit to the number one can keep on a small plot of ground. We have all the good, fresh milk we want (better than cow's milk), make our own butter and with the aid of a few chickens we *live*.

If there is any drawback to this mode of living it is because I do not have enough of a sickly, shut-in look to be mistaken for a dentist.

I would like to hear about other hobbies.

C. E. Leach.

Editor of Dental Digest:

A patient handed me this little rhyme the other day:

How many acorns have to fall
For one that is growing trees?
How many teeth must be yanked out
For one that's causing disease?

W. A. C.

Wanted—A Denture Contract

Editor Dental Digest:

I would like to ascertain through the Dental Digest whether there is any one using a printed contract form covering the various angles of denture construction? I have seen such contracts used by orthodontists.

M. S. M.

Information Wanted

The Bonwill Mechanical Mallet

For the purpose of forwarding a revival of foil fillings at the coming meeting of the National Dental Association in Milwaukee in August, will any dentist who has had experience in the use of the Bonwill Mechanical Mallet (now issued as the S. S. White Engine Mallet No. 3), and who knows the Bonwill technique in condensing gold foil with that instrument, kindly send his name and address to

Dr. Charles Southwell,
409 Goldsmith Building, Milwaukee, Wis.

May

May brings with her the beauty and fragrance of hawthorn blossoms and the song of the nightingale. Our old poets delighted in describing her as a beautiful maiden, clothed in sunshine and scattering flowers on the earth, while she danced to the music of birds and brooks. She has given a rich greenness to the growing things, and the grass is now tall enough for the flowers to play at hide-and-seek as they are chased by the wind.

May was the second month in the old Alban calendar, the third month in that of Romulus, and the fifth in the reign of a later monarch. It consisted of twenty-two days for a long period of time, but a bird named Julius Caesar, during his spare time between wars, started to play ducks and drakes with the calendar and gave May thirty-one days, this arrangement remaining undisturbed up to the present time. In our own spacious era May has the distinction of being one of the daylight-saving months.

EXTRACTIONS

There are no dividends in quarrels.

Society has two grand divisions—shining lights and reflectors.

The advantages of poverty are many—but . . . . . to be continued in our next.

(Jim)—I saw you weeping at the picture show.
(Clara)—Well, it was a moving picture.

In 1896 there were only 4 automobiles in the United States—now there are 7,000,000.

An optimist is a man who expects to raise vegetables like those pictured in the seed catalogues.

(Teacher)—Now Robbie, name the four seasons.
(Robbie)—Salt, pepper, mustard and vinegar.

"If Shakespeare were alive today would he be looked upon as a remarkable man?"
"Sure he would; he would be three hundred years old."

"Look, grandpa, a new golf ball I found, lost on the links."
"Are you sure it was lost, Sandy?"
"Yes, grandpa; I saw the man and his caddy looking for it."

(Tom)—Well, you did not answer my question. How about it?
(Jerry)—Yes, I did. I shook my head in disapproval.
(Tom)—That's strange. I didn't hear anything rattle.

(Notice)—Baron Upsidedownsky of Moscow has just arrived in America. He is anxious to place his affections and title in the keeping of an American heiress. Now, girls, get ready to meet the Count, and be sure to bring along your check book.

"Befo' I's gwine to sympathize wif a man dat is 'busin' de trusts," said Uncle Eben, "he's got to show me dat his financial difficulties ain' caused by buying circus tickets an' playin' policy."

"Bridget," called the mistress from upstairs, "have you turned the gas on in the parlor as I told you?"
"Yis, Mum," answered the new domestic jewel, "can't yez smell it?"

"Tell me something about Esau," directed the Catechism teacher.
"Esau," replied the pupil, after a pause, "was a man who wrote fables and sold the copyright to a publisher for a bottle of potash."

The reporter said in his write-up of a golf game that an approach shot was so strong that "it passed the green and hit a lady on the bounce." * * * Boy, hand us the dictionary of anatomy, quick!

Returning from the dentist's, where he had gone to have a tooth extracted, little Henry reported as follows:
"The doctor told me 'fore he began that if I cried or screamed it would cost me 75 cents, but if I was a good boy it would be only half a dollar."
"Did you scream?" his mother asked.
"How could I?" answered Henry. "You only gave me half a dollar."

DIETETICS and HEALTH

Maintaining a Healthy Body

THE resistive forces of the body may be defined as nature's defences against harmful agencies. They are the weapons with which one combats the microorganisms of disease. They are the factors that are preeminently concerned in maintaining a healthy body.

Sixty years ago Herbert Spencer, in his work on Education, referred to the failure of formal gymnastics to accomplish what had been promised in its name. For this reason he preferred the plays and sports that appealed to the young person. Gymnastics were fundamentally defective, formal exercises of a will-less character that could never supply the place of the movements prompted by nature. There is greater benefit in the riotous glee with which young people carry on their frolics.

While no person can lengthen the life of the resistive forces of the body who does not exercise in a rational manner, yet it is very desirable that the element of interest be present. Even what is termed "formal gymnastics" become less irksome if associated with noticeable bodily improvement.

Young men and women forget that it is the body which determines their efficiency, that they are only worth what the body will permit them to do. The muscles are merely instruments which act in accordance with the dictates of the will, or the reflexes, and the better these instruments, the greater the good that can be accomplished. This is especially true in the case of those who have been well educated intellectually.

It is more or less clearly recognized that no skill, no learning, no intellectual greatness can carry its fullest influence without a certain element of physical capacity in the individual.

There is within each individual a harp of emotions upon which chord of harmony or dissonance are struck graceful or awkward movements. Precisely what this harp is, is not known; only a long and careful study of rhythm and harmony will answer the question. It is certainly there, and men are made either happy or distressed by the feelings that motion arouses.

It is such a satisfying bit of information to know that if one is not

able to acquire the beautiful physiques of the male or female gods he can at least add to his contentment and health by rational physical activity plus right living.—From Dr. Fone's Book of Instructions for Dental Hygienists.

Origin of Fruits

The strawberry, says one of the government experts, comes from a cross between the native strawberry of Virginia and that of Chili. The raspberry is native in temperate Europe and in Asia. The apricot originated in China. The peach was originally a Chinese fruit. The cherry originated round the Caspian Sea. The plum comes from the Caucasus and Turkey.

The pear is native in temperate Europe and western Asia. The quince comes from southeastern Europe, the Caucasus, and the Caspian region. The apple is native all over Europe, in the Caucasus, round the Black Sea, and in Persia. The almond comes from Transcaucasia, Mesopotamia, Persia, Turkestan, and Algeria.

The fig seems to have originated round the Mediterranean, particularly in Syria. The grape is native in southern Europe, Algeria, Morocco, and western Asia. The red currant grows wild all over Europe, in the Caucasus, the Himalayas, Manchuria, Japan, andArctic-America. The walnut comes from the Caucasus, Persia, and northern India. The sweet orange originated in southern China and Cochin China. The citron is of Indian origin.

Romance

Romance is what the world once was,
And what the world shall be,
And what the world is now for those
That have the eyes to see.

It is the feather in the cap,
The dreamlight in the eye,
All that is done for faith and fun,
The gallant do-or-die.

Romance is girl, romance is boy,
Romance is eighty-five;
Romance is every hour that we
Are splendidly alive!

FUTURE EVENTS

The Annual Meeting of the CONNECTICUT DENTAL HYGIENISTS' ASSOCIATION will be held in Bridgeport, Connecticut, May 20th and 21st, 1921, at the Stratfield Hotel. An interesting program of addresses and clinics is being prepared. All ethical dentists and dental hygienists are invited.

HELEN ROSENTHAL, *Secretary*,
563 State St., Bridgeport, Conn.

The meeting of the NORTHERN OHIO DENTAL ASSOCIATION will be held in Cleveland June 6, 7 and 8, 1921. Important papers will be read by Drs. Campbell, Lucas, Nesbett, Hall and Lyons. Demonstrative Clinic Courses will be offered free, and will include the practical subjects of the day.

J. V. GENTILLY, *Chairman*,
809 Schofield Bldg., Cleveland, Ohio.

You are cordially invited to *Invest* your time to better yourself in Dentistry by attending the Annual Meeting of the NORTHEASTERN MASSACHUSETTS DENTAL SOCIETY, to be held at the New Ocean House, Swampscott, June 7-8-9, 1921.

HENRY I. YALE, D. M. D., *Secretary*.

The next annual meeting of the FLORIDA STATE BOARD OF DENTAL EXAMINERS will be held in Jacksonville, June 9th to 13th, inclusive, for the purpose of examining all qualified applicants. All applications should be in the hands of the Secretary not later than June 1st, 1921. For application blanks and information address R. P. Taylor, 414-415 St. James Building, Jacksonville, Florida.

THE TENNESSEE BOARD OF DENTAL EXAMINERS will hold their next meeting June 14th, 1921, at 9:30 A. M., at Vanderbilt Dental Dept., Nashville, Tennessee, for the purpose of examining applicants who wish to secure license to practice Dentistry in the State of Tennessee. Secure application blanks from F. W. Meacham, Secretary and Treasurer, Hamilton National Bank Building, Chattanooga, Tennessee.

THE WISCONSIN STATE BOARD OF DENTAL EXAMINERS will conduct a licensing examination at the Marquette Dental College in Milwaukee, beginning Saturday, June 18, and continuing to Saturday, June 25, 1921.

All credentials should be in the hands of the Secretary of the Board not later than June 5, 1921. For other details and information apply to

WILLIAM KETTLER, *Secretary*,
State Board of Dental Examiners,
408 Berlin Arcade, Milwaukee, Wis.

THE SOUTH CAROLINA STATE DENTAL ASSOCIATION will hold its annual meeting in Greenville, S. C., June 14, 15, 16, 1921.

ERNEST C. DYE, *Secretary.*

The next meeting of the WEST VIRGINIA BOARD OF DENTAL EXAMINERS will be held in Charlestown, W. Va., beginning at 9 o'clock on Tuesday morning, June 28, 29 and 30, 1921. For further information and application blanks address R. MASON HITE, *Secretary*, Mannington, W. Va.

THE BOARD OF DENTAL EXAMINERS OF DISTRICT OF COLUMBIA will hold its next meeting June 20 to 24, 1921, at Georgetown University, Dental Department, 920 H Street, N. W.

The theoretical examination will consist of Oral Surgery and Physiology (Dr. Barnhard); Bacteriology and Histology (Dr. Dolmage); Prosthetic Dentistry and Orthodontia (Dr. Hawley); Operative Dentistry, Pathology, Materia Medica and Therapeutics (Dr. Cobey), and Anatomy and Chemistry (Dr. Simkins).

No application will be considered unless accompanied by the examination fee and an unmounted photograph of the candidate.

Each applicant must report to the Secretary on the first evening and receive a card on which is his examination number, and throughout the examination he will be known by this number.

The laws of the District of Columbia do not permit the granting of a temporary license.

Fee for the examination, $10.00, and $1.00 for the certificate if granted.

WM. H. BARNHARD, *Secretary*,
1225 New York Ave., N. W., Washington, D. C.

The second annual Post-Graduate Course of the IDAHO STATE DENTAL ASSOCIATION will be held in Boise June 27-28-29-30, July 1-2, inclusive. Class instructors: Dr. D. D. Campbell, Full Denture Construction; Dr. Arthur E. Smith, Oral Surgery, Exodontia, Anesthesia.

L. G. PHILLIPS, *President*, Jerome, Idaho.
M. J. GOODE, *Secretary*, Filer, Idaho.

The next meeting of the SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS will be held in Sioux Falls, South Dakota, June 28th, 29th and 30th, 1921, beginning at 9.00 o'clock Tuesday morning, June 28th.

All applications must be in the hands of the Secretary by June 15th. Fee for examination $25.00. No reciprocity or interchange. Full information and application blanks may be received by addressing

L. R. WALSTON, *Secretary*,
Redfield, S. D.

THE LOS ANGELES COUNTY DENTAL HYGIENE SOCIETY has been organized. Mrs. Gertrude Buford has been elected President; Miss H. Cramer, Vice-President; Miss Ethel McKinley, Secretary; Mrs. Caroline Carter, Treasurer.

ETHEL MCKINLEY, *Secretary.*

10,000 Acres a Day for Pulp

About nine-tenths of all the paper used is made from wood pulp. Magazines and newspapers are almost as necessary as food. It requires daily the trees from ten thousand acres of land to supply the present wood used in the United States. A single Sunday newspaper edition strips the trees from fifteen acres of forest. The consumption of paper at present is ten per cent more than the mills are producing, resulting in an annual shortage of two hundred thousand tons.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of The Dental Digest
at New York, N. Y.
State of New York } ss.
County of New York }

Published monthly
for April, 1921.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared John R. Sheppard, who, having been duly sworn according to law, deposes and says that he is the Secretary of the Dentists' Supply Co., Publishers of The Dental Digest, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

NAME OF	POST OFFICE ADDRESS
Publisher, The Dentists' Supply Company	220 W. 42nd St., New York
Editor, George Wood Clapp	New Rochelle, N. Y.
Managing Editor, George Wood Clapp	New Rochelle, N. Y.
Business Manager, Lawrence W. Dunham	Ridgefield Park, N. J.

2. That the owners are:

The Dentists' Supply Company	220 W. 42nd St., New York
George H. Whiteley	York, Pa.
Dean C. Osborne	1347 Dean St., Brooklyn, N. Y.
Sade E. L. Osborne	1347 Dean St., Brooklyn, N. Y.
John R Sheppard	155 Riverside Drive, New York
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LeRoy Frantz	New Rochelle, N. Y.
Gertrude L. Frantz, Trustee for Horace G. Frantz	Colorado Springs, Colo.
Viola F. Good	New Rochelle, N. Y.
Ethel F. Tomb	Newton Centre, Mass.
Mabel G. De Sanno	Oak Lane, Philadelphia, Pa.
G. H. Whiteley, Jr.	York, Pa.
J. Osborne Whiteley	York, Pa.
Ida O. Whiteley	York, Pa.
De Trey & Co., Ltd.	23 Swallow St., London, Eng.

De Trey & Co., Ltd., is a corporation organized under the laws of England, with authorized capital stock of 500,000 shares of One Pound each, ownership of which is scattered over a considerable part of Europe and includes a long list of names unknown to us, and probably a number of banks and other corporations.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

THE DENTISTS' SUPPLY COMPANY,
J. R. Sheppard, *Sec'y & Treas.*

Sworn to and subscribed before me this 21st day of March, 1921.

[Seal] Gretchen M. Baltz
Notary Public, Westchester County
Certificate filed in N. Y. County
Clerk's No. 793; Register No. 1703—My commission expires March 30, 1921.